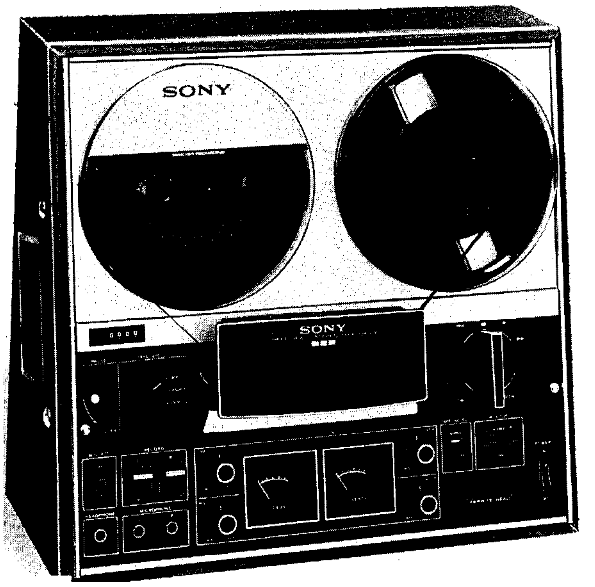
SONY TC 378

MODEL

SERVICE MANUAL

TC-377

AEP Model
AUS Model
Canada Model
E Model
USA Model



STEREO TAPECORDER

SPECIFICATIONS

Power Requirements:	AC 120V, 60Hz (Canada, USA) AC 100V, 110V, 117V, 125V, 220V, 240V, 50/60Hz (E) AC 110V, 127V, 220V, 240V, 50/60Hz (AEP, AUS)
Power Consumption:	38W (Canada, USA) 48W (AEP, E, AUS)
Bias Frequency:	Approx. 160kHz
Track System:	Four track two channel stereo and mono
Reel Size:	7" maximum
Tape Speed:	19 cm/s ($7\frac{1}{2}$ ips) 9.5 cm/s ($3\frac{3}{4}$ ips) 4.8 cm/s ($1\frac{7}{8}$ ips)

Frequency Response:	SPECIAL (SONY SLH tape)	
	NAB	DIN
19cm/s ($7\frac{1}{2}$ ips):	20~30,000Hz	30~24,000Hz
19cm/s ($7\frac{1}{2}$ ips):	30~25,000Hz ±3dB	
9.5cm/s ($3\frac{3}{4}$ ips):	30~20,000Hz	40~16,000Hz
	NORMAL (Standard tape)	
	NAB	DIN
19cm/s ($7\frac{1}{2}$ ips):	20~25,000Hz	30~20,000Hz
19cm/s ($7\frac{1}{2}$ ips):	30~20,000Hz ±3dB	
9.5cm/s ($3\frac{3}{4}$ ips):	30~17,000Hz	40~13,000Hz
4.8cm/s ($1\frac{7}{8}$ ips):	30~9,000Hz	
Signal-to-Noise Ratio:	NORMAL	SPECIAL
	52dB or better	55dB or better

Distortion:	1.2%
Wow and Flutter:	19 cm/s ($7\frac{1}{2}$ ips): 0.09% (RMS) weighted 9.5 cm/s ($3\frac{3}{4}$ ips): 0.12% (RMS) weighted 4.8 cm/s ($1\frac{7}{8}$ ips): 0.17% (RMS) weighted
Inputs:	Two MICROPHONE inputs Impedance: low impedance Maximum sensitivity: -72dB (0.2mV) Two LINE INputs Impedance: 100kΩ Maximum sensitivity: -22dB (0.06V) REC/PB connector (AEP, E, AUS) Input impedance: 3.8kΩ
Outputs:	Two LINE OUTputs Load impedance: more than 10kΩ Output level: 0dB (0.78V) with 100kΩ load REC/PB connector (AEP, E, AUS) Output impedance: 3.3kΩ HEADPHONE output Load impedance: 8Ω
Semiconductors:	23 transistors, 5 diodes
Record Head:	RF140-2902 (70Ω/1kHz)
Playback Head:	PF140-4202 (1kΩ/1kHz)
Erase Head:	EF18-2902A1 (1.6kΩ/160kHz)
Motor:	IC-624H1 (induction motor)
Dimensions:	418 (w) x 210 (h) x 392 (d) mm $16\frac{1}{2}$ (w) x $8\frac{5}{16}$ (h) x $15\frac{7}{16}$ (d) inches
Weight:	10.6kg, 23lb 6oz (Canada, USA) 11.5kg, 25lb 6oz (AEP, E, AUS)

SONY®

SERVICE MANUAL

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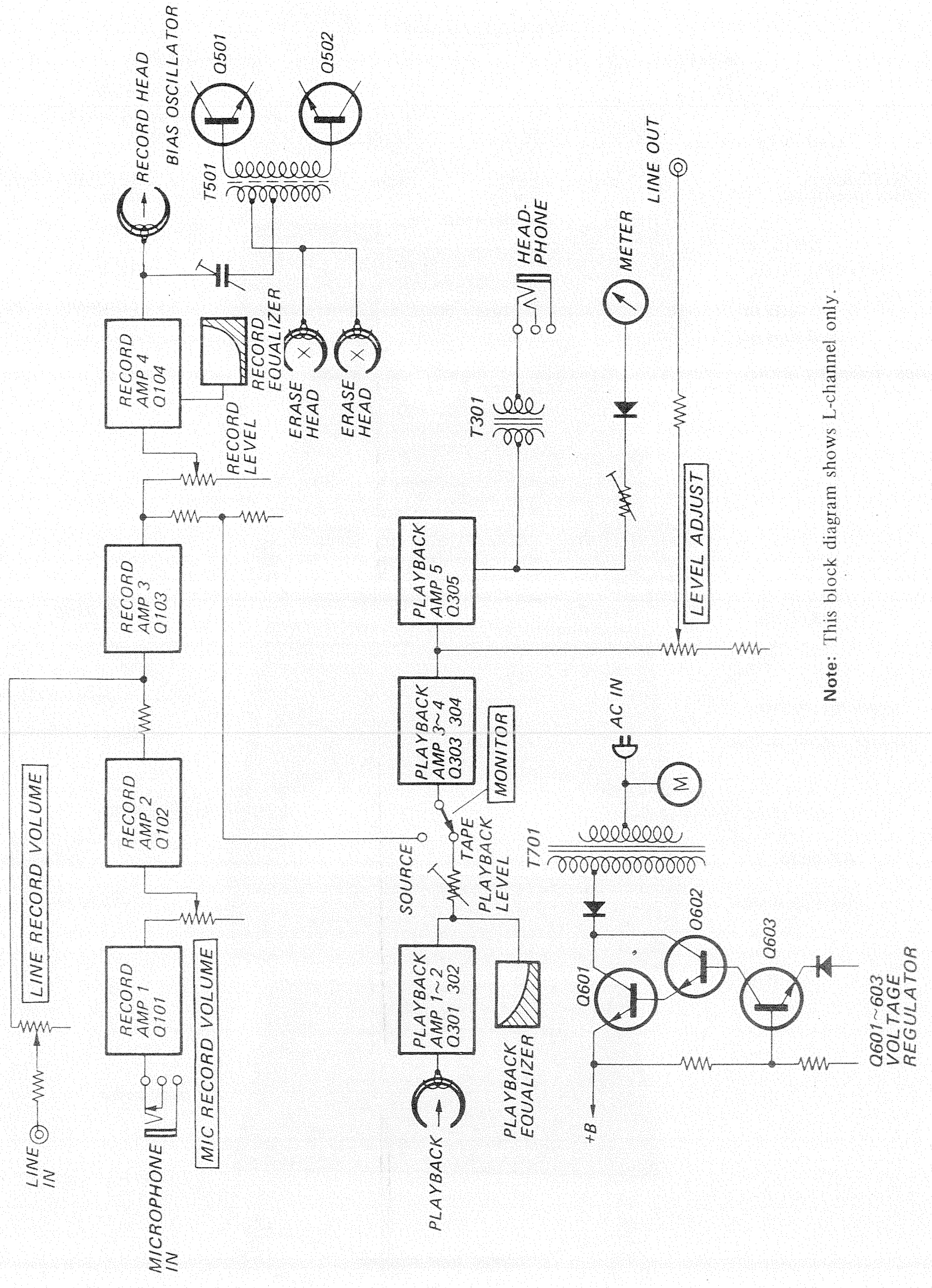
When ordering replacement parts, use PART NUMBERS listed in Parts List or shown in EXPLODED VIEW.
Parts List reference numbers should not be used.

SECTION 1
OUTLINE

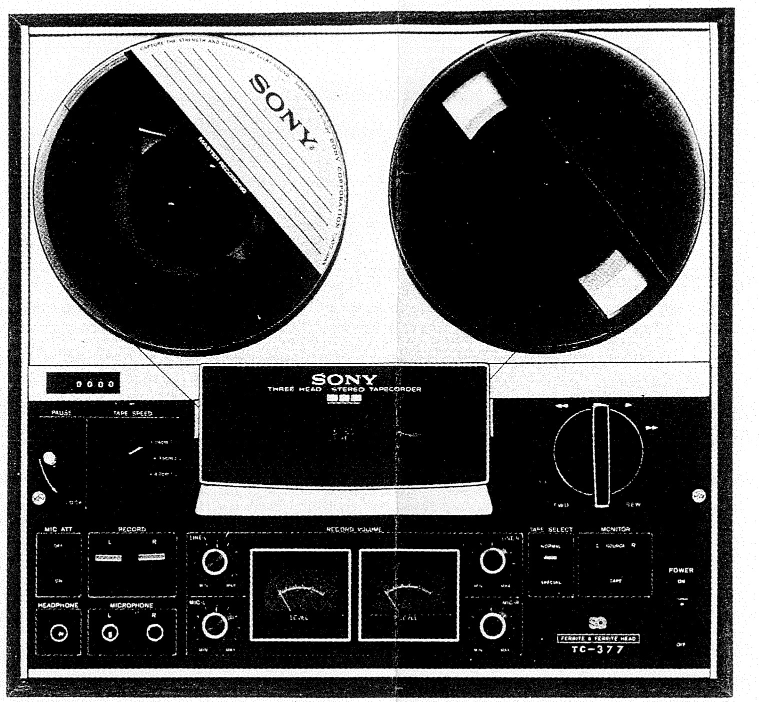
1-1. BLOCK DIAGRAM


RECORD HEAD
BIAS OSCILLATOR
Q501
Q502
T501
RECORD AMP 4 Q104
RECORD EQUALIZER
ERASE HEAD
ERASE HEAD
RECORD LEVEL
RECORD AMP 3 Q103
RECORD AMP 2 Q102
RECORD AMP 1 Q101
LINE RECORD VOLUME
MIC RECORD VOLUME
LINE IN
MICROPHONE IN
HEAD-PHONE
T301
METER
LINE OUT
LEVEL ADJUST
PLAYBACK AMP 5 Q305
PLAYBACK AMP 3~4 Q303 304
MONITOR
SOURCE
TAPE
PLAYBACK LEVEL
PLAYBACK AMP 1~2 Q301 302
PLAYBACK EQUALIZER
PLAYBACK
AC IN
M
T701
Q601
Q602
Q603
+B
Q601~603 VOLTAGE REGULATOR

Note: This block diagram shows L-channel only.

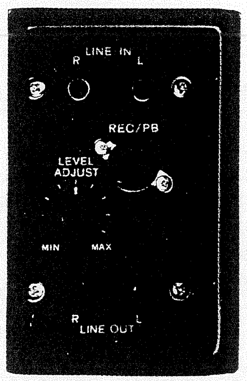
1-2. MAJOR PARTS LOCATION

Front Panel

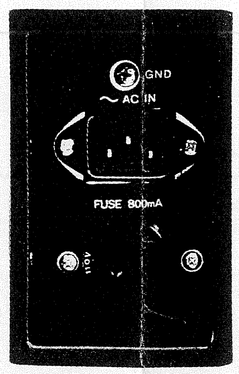

SONY
THREE HEAD STEREO TAPECORDER
TC-377

Side Panel

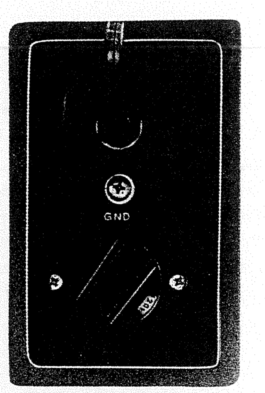
(AEP, AUS, E)


LINE IN
R
L
REC/PB
LEVEL ADJUST
MIN
MAX
R
LINE OUT

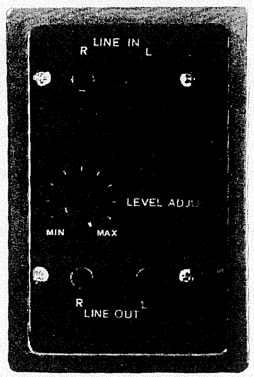
(AEP, AUS)


GND
~ AC IN
FUSE 800mA

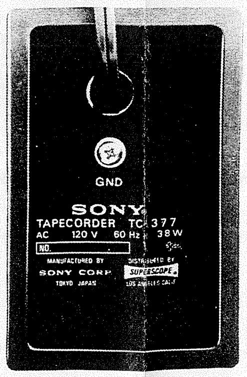
(E)



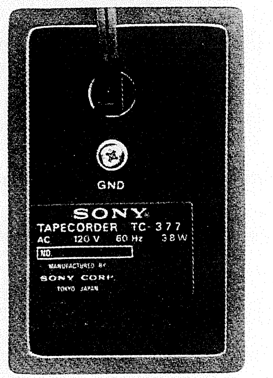
(Canada, USA)


LINE IN
R
L
LEVEL ADJ.
MIN
MAX
R
LINE OUT

(USA)

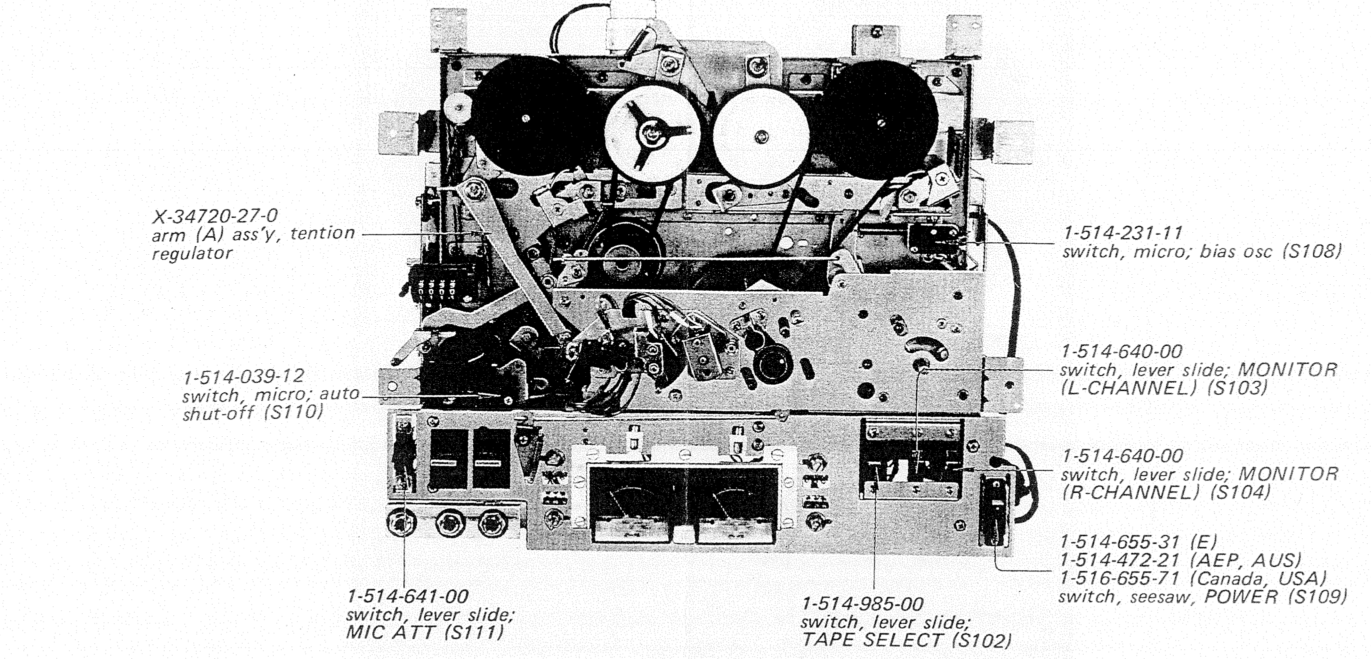

GND
SONY
TAPECORDER TC-377
AC 120 V 60 Hz 38 W
SONY CORP.
TOKYO JAPAN

(Canada)

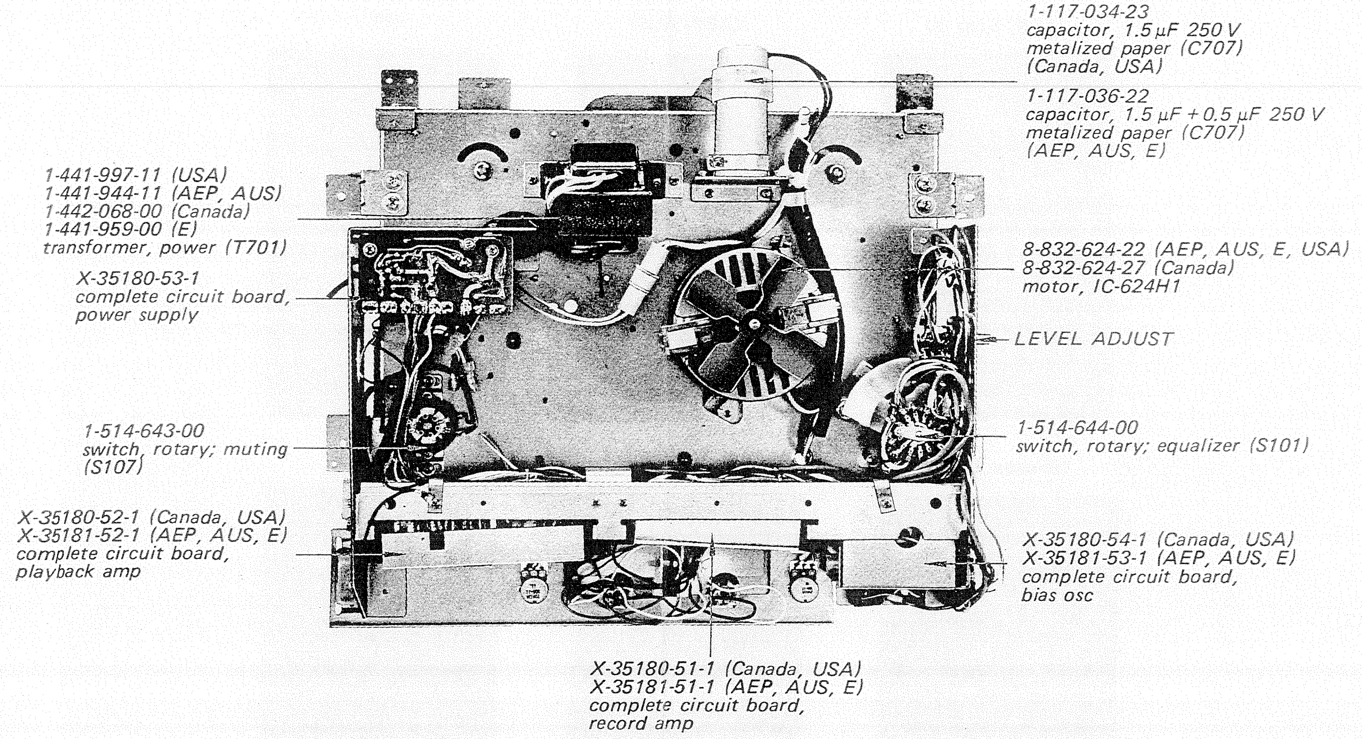

GND
SONY
TAPECORDER TC-377
AC 120 V 60 Hz 38 W
SONY CORP.
TOKYO JAPAN

1-3. INTERNAL VIEWS

Chassis Front

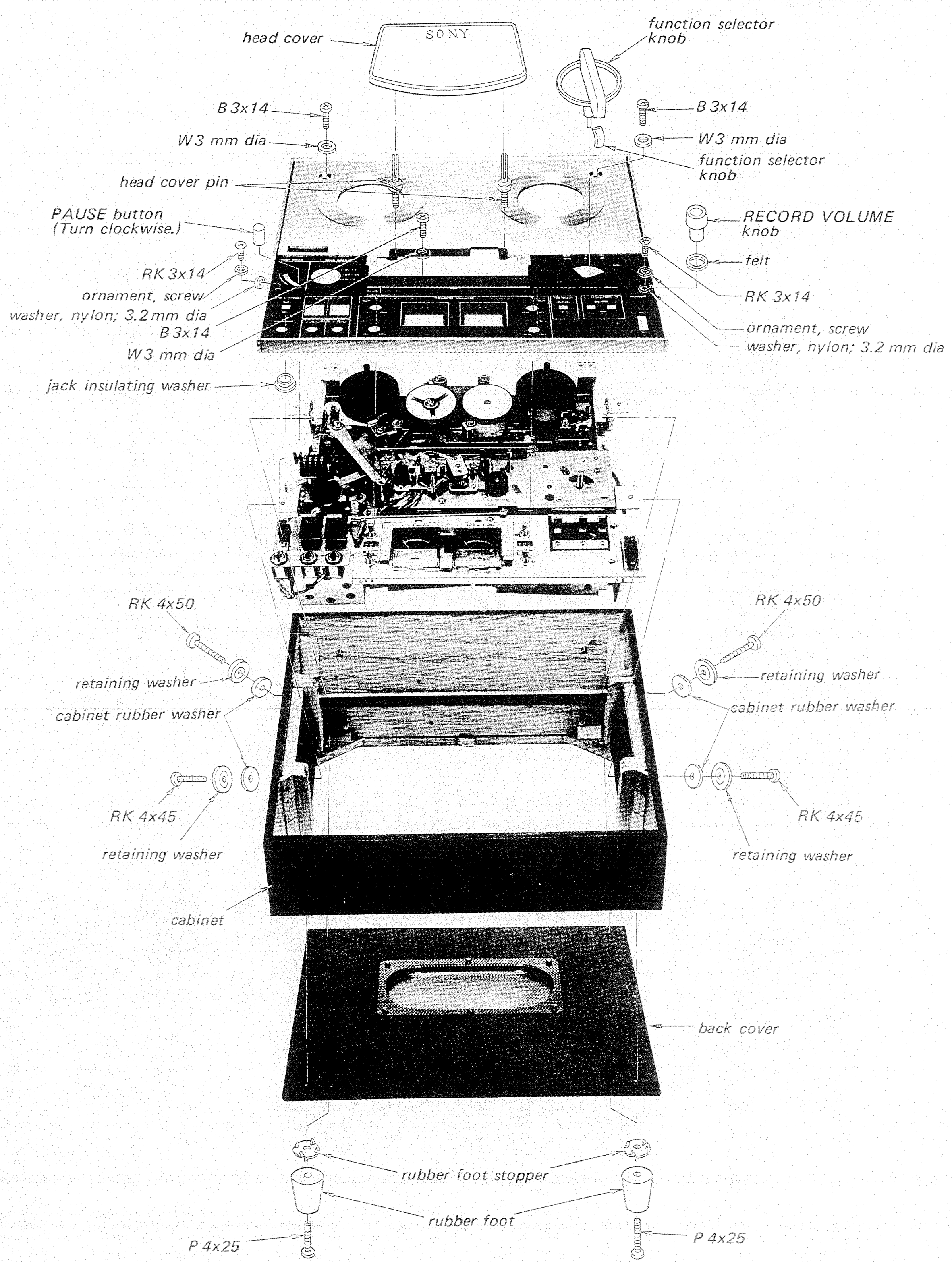

X-34720-27-0
arm (A) ass'y, tention regulator
1-514-039-12
switch, micro; auto shut-off (S110)
1-514-641-00
switch, lever slide; MIC ATT (S111)
1-514-985-00
switch, lever slide; TAPE SELECT (S102)
1-514-231-11
switch, micro; bias osc (S108)
1-514-640-00
switch, lever slide; MONITOR (L-CHANNEL) (S103)
1-514-640-00
switch, lever slide; MONITOR (R-CHANNEL) (S104)
1-514-655-31 (E)
1-514-472-21 (AEP, AUS)
1-516-655-71 (Canada, USA)
switch, seesaw, POWER (S109)

Chassis Rear

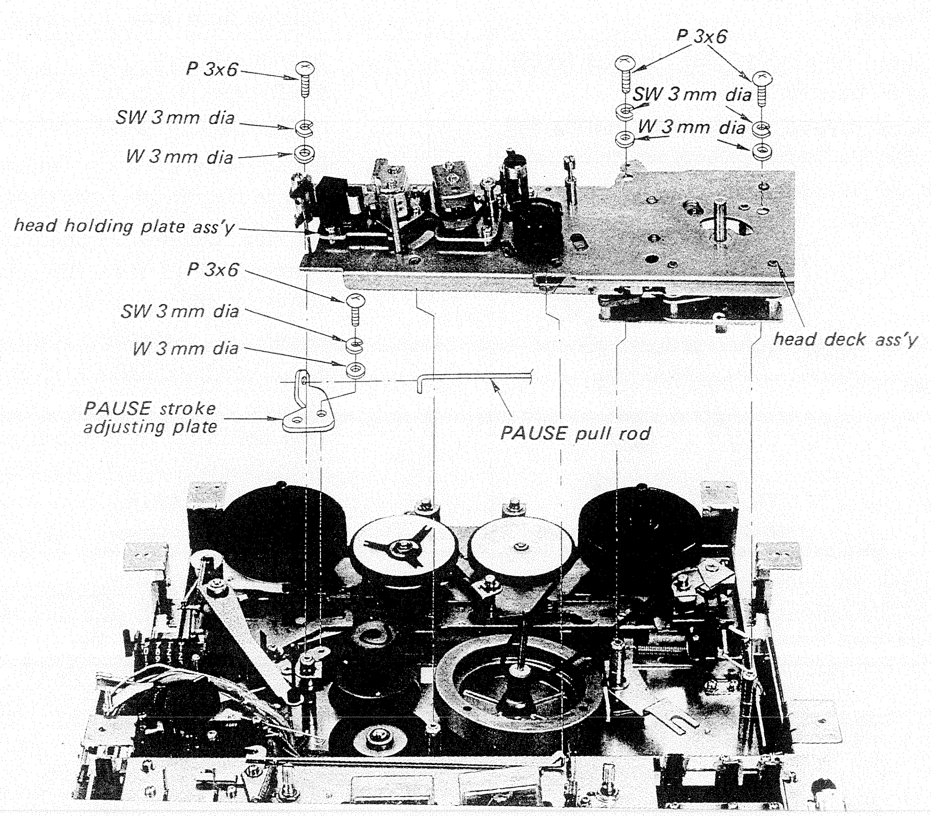

1-441-997-11 (USA)
1-441-944-11 (AEP, AUS)
1-442-068-00 (Canada)
1-441-959-00 (E)
transformer, power (T701)
X-35180-53-1
complete circuit board, power supply
1-514-643-00
switch, rotary; muting (S107)
X-35180-52-1 (Canada, USA)
X-35181-52-1 (AEP, AUS, E)
complete circuit board, playback amp
X-35180-51-1 (Canada, USA)
X-35181-51-1 (AEP, AUS, E)
complete circuit board, record amp
1-117-034-23
capacitor, 1.5 µF 250 V metalized paper (C707) (Canada, USA)
1-117-036-22
capacitor, 1.5 µF + 0.5 µF 250 V metalized paper (C707) (AEP, AUS, E)
8-832-624-22 (AEP, AUS, E, USA)
8-832-624-27 (Canada)
motor, IC-624H1
LEVEL ADJUST
1-514-644-00
switch, rotary; equalizer (S101)
X-35180-54-1 (Canada, USA)
X-35181-53-1 (AEP, AUS, E)
complete circuit board, bias osc

SECTION 2
DISASSEMBLY

2-1. CABINET REMOVAL


head cover
SONY
function selector knob
B 3x14
W3 mm dia
B 3x14
W3 mm dia
function selector knob
head cover pin
PAUSE button (Turn clockwise.)
RECORD VOLUME knob
felt
RK 3x14
ornament, screw
washer, nylon; 3.2 mm dia
B 3x14
W3 mm dia
RK 3x14
ornament, screw
washer, nylon; 3.2 mm dia
jack insulating washer
RK 4x50
retaining washer
cabinet rubber washer
RK 4x45
retaining washer
RK 4x50
retaining washer
cabinet rubber washer
RK 4x45
retaining washer
cabinet
back cover
rubber foot stopper
rubber foot
P 4x25
P 4x25

2-2. HEAD DECK REMOVAL


P 3x6
SW 3 mm dia
W 3 mm dia
head holding plate ass'y
P 3x6
SW 3 mm dia
W 3 mm dia
PAUSE stroke adjusting plate
PAUSE pull rod
P 3x6
SW 3 mm dia
W 3 mm dia
head deck ass'y

CAUTION

(1) Never put the machine upside down on the hard plate with the head cover removed, or the pin of the tape shifter, the shut-off arm pin, the tension arm and others will be bent by the weight of the machine.
If it is necessary to put the machine upside down, put it on a soft cloth with the head cover attached.

(2) Do not short-circuit B^+ circuit to ground, or transistor Q601 will be broken.

(3) When removing PAUSE button, turn it clockwise.

(4) Turn on the power switch after being certain that the motor fan does not touch anything.

MEMO

SECTION 3
ADJUSTMENTS

3-1. MECHANICAL ADJUSTMENTS

Precaution:

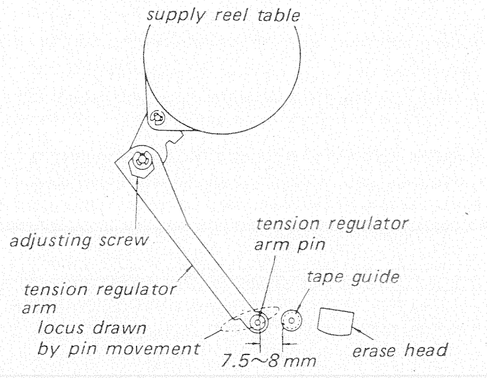
Do not use magnetized screwdriver for adjustments.

After adjustments, apply locking paint to the adjusted parts.

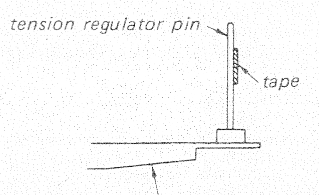
Tension Regulator Adjustment

STOP mode

1. Loosen the adjusting screw and adjust so that the clearance shown is 8 mm (5/16") after having been turned reel table counterclockwise by hand.


supply reel table
adjusting screw
tension regulator arm pin
tape guide
tension regulator arm
locus drawn by pin movement
erase head
7.5~8 mm

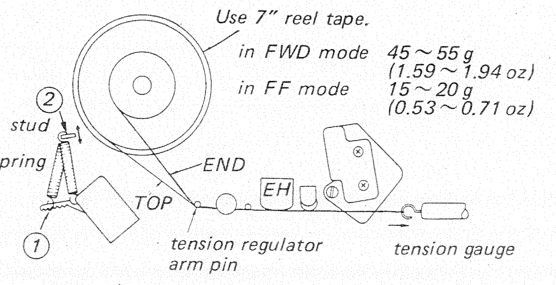
2. Tape should be in contact with tension regulator pin uniformly at beginning and end portion of it.


tension regulator pin
tape
tension regulator arm

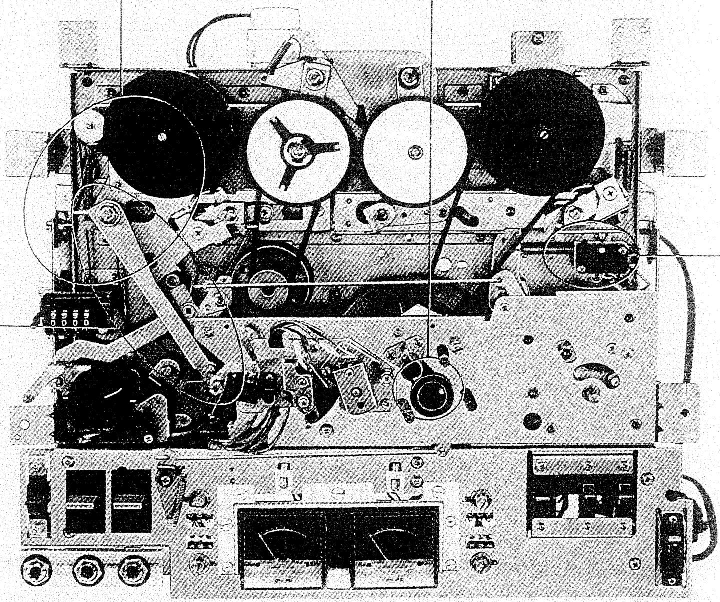
Tension Regulator Back-tension Adjustment

FWD and FF modes

This adjustment should be done after Tension Regulator Adjustment.


Use 7" reel tape.
in FWD mode 45 ~ 55 g (1.59 ~ 1.94 oz)
in FF mode 15 ~ 20 g (0.53 ~ 0.71 oz)
②
stud
spring
①
END
TOP
EH
tension regulator arm pin
tension gauge

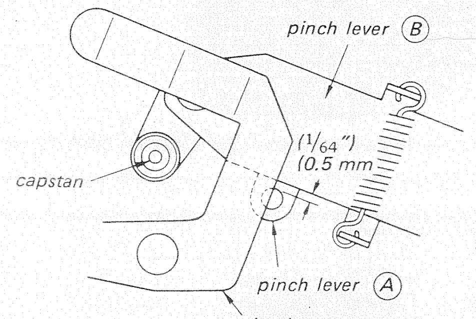
① Adjust by changing the spring hook position.
② If necessary, adjust by bending the stud or perform the tension regulator adjustment again.



Pinch Roller Pressure Check

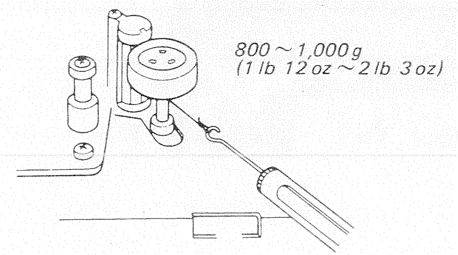
STOP mode

1. Remove head deck ass'y. (See "HEAD DECK REMOVAL" on page 7)
2. Put dummy capstan into capstan bearing and be sure that the clearance between pinch levers Ⓐ and Ⓑ is approx. 0.5 mm (1/64").


pinch lever Ⓑ
(1/64")
(0.5 mm)
capstan
pinch lever Ⓐ
retractive lever

head deck —back view—

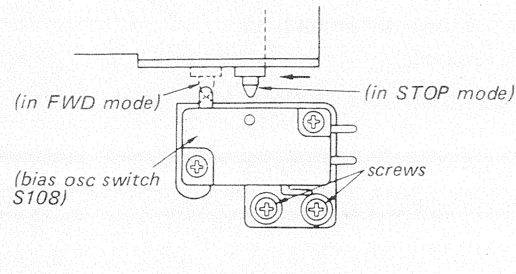
3. Be sure that the tension gauge indicates 800~1,000 g (1 lb 12 oz~2 lb 3 oz) when the pinch roller is detached from capstan in FWD mode.


800 ~ 1,000 g
(1 lb 12 oz ~ 2 lb 3 oz)

Bias Switch Position Adjustment

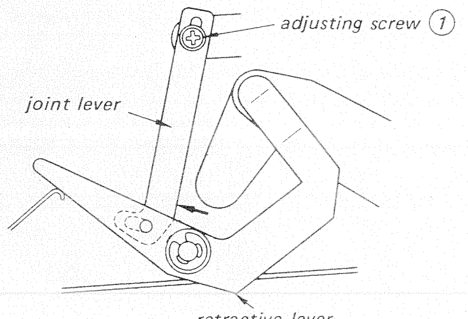
Loosen two screws and adjust by positioning the switch.

Switch should be turned ON in FWD mode, and with function selector knob changed slowly from FWD to STOP, record levers are released after the switch turns OFF.

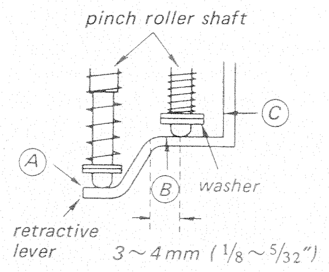

(in FWD mode)
(in STOP mode)
(bias osc switch S108)
screws

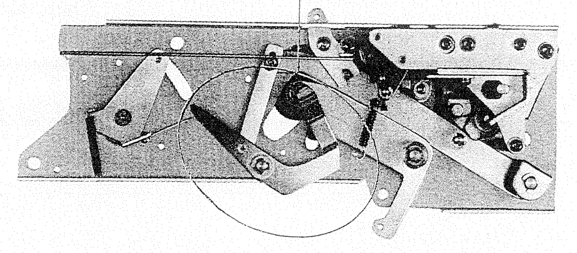
Pinch Roller Stroke Adjustment

1. Remove head deck (See page 7).
2. Loosen adjusting screw ① so that pinch roller shaft comes in contact with retractive lever at position Ⓐ in STOP mode.
3. Fix adjusting screw ① while pushing the joint lever in the direction shown by arrow.
4. Put the dummy capstan into the capstan bearing and be sure that pinch roller shaft moves by approx. 3~4 mm (1/8~5/32") on the surface of retractive lever when function selector knob is changed from STOP to FWD.
5. Be sure that the washer on pinch roller shaft does not come in contact with Ⓒ position when function selector knob is changed slowly from FWD to FF.


adjusting screw ①
joint lever
retractive lever

head deck —back view—


pinch roller shaft
Ⓒ
Ⓐ
Ⓑ
washer
retractive lever
3 ~ 4 mm (1/8 ~ 5/32")



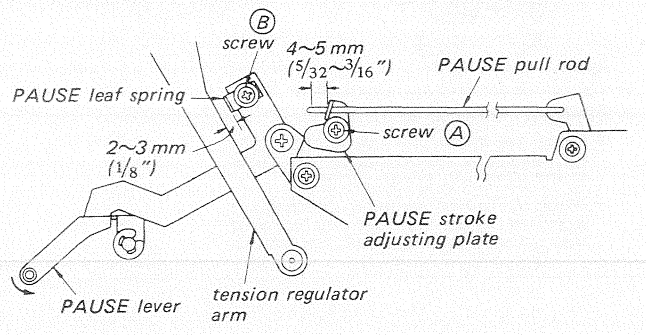
Head deck bottom view.

PAUSE Adjustment

STOP mode

This adjustment should be done after tension regulator adjustment.

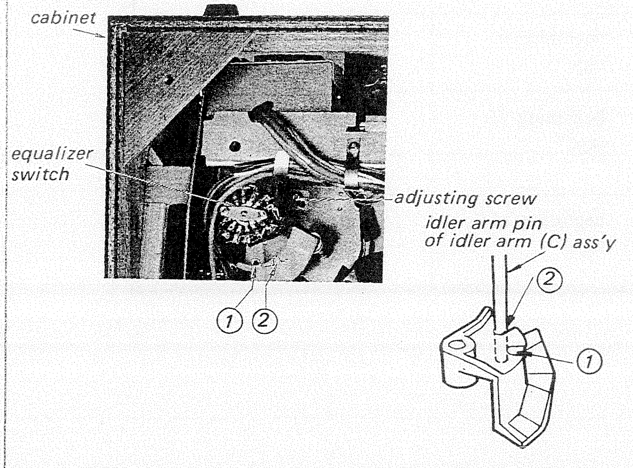
1. Adjust screw Ⓐ so that the distance between the end of PAUSE pull rod and PAUSE stroke adjusting plate is 4∼5 mm (5/32″∼3/16″) in STOP mode.
2. Be sure that the clearance between pinch roller and capstan is more than 1 mm (1/32″) when pulling the PAUSE lever in FWD mode, and PAUSE button is not locked when pulling it in STOP mode.
3. Adjust screw Ⓑ so that the clearance between tension regulator arm and PAUSE leaf spring is 2∼3 mm (1/8″) in STOP mode. Brake should work, when pulling the PAUSE lever in FWD mode.

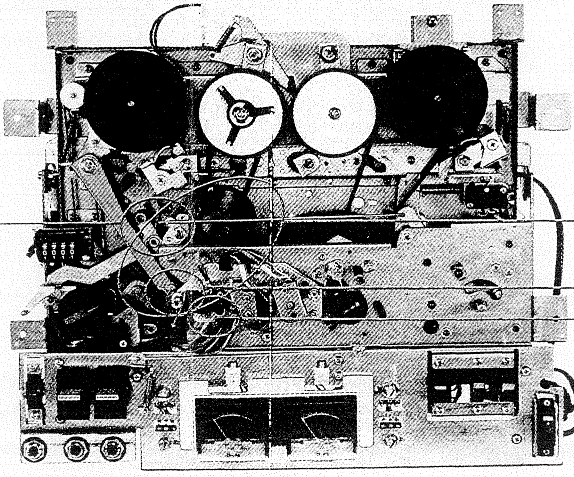

Ⓑ
screw
4∼5 mm
(5/32∼3/16″)
PAUSE pull rod
PAUSE leaf spring
screw Ⓐ
2∼3 mm
(1/8″)
PAUSE stroke adjusting plate
PAUSE lever
tension regulator arm

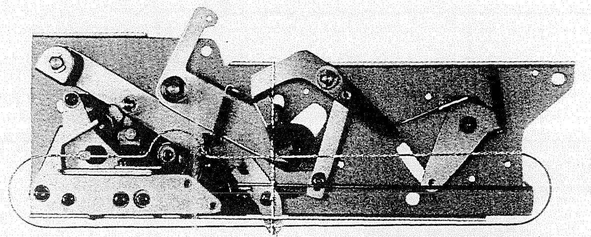
Speed Selector Cam Position Adjustment

FWD mode

Loosen the screw and adjust to locate the idler arm pin in the stopper slot ② shown, at 19 cm/s tape speed.


cabinet
equalizer switch
adjusting screw
idler arm pin of idler arm (C) ass'y
②
①
① ②



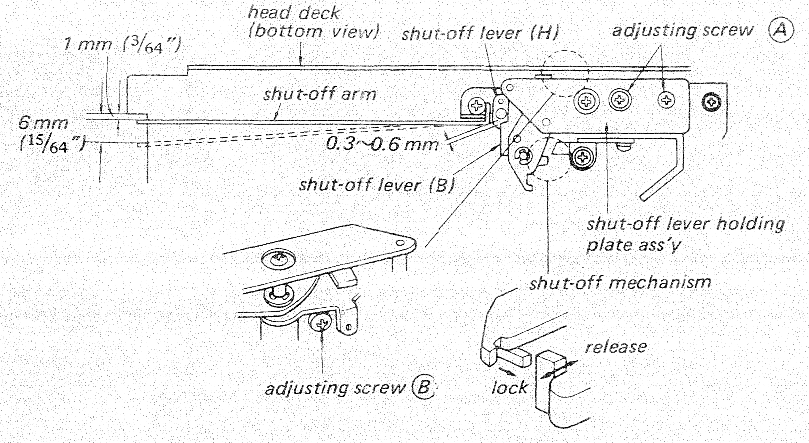


Head deck bottom view.

Shut-off Mechanism Adjustment

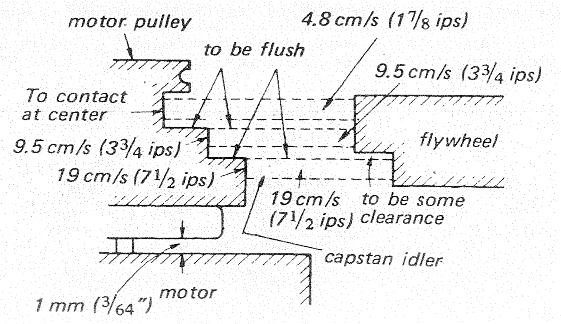
STOP mode

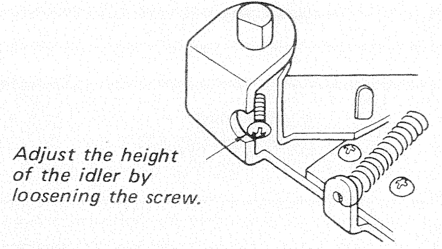
1. Loosen two screws Ⓐ and adjust by positioning the shut-off lever holding plate ass'y so that the shut-off mechanism is locked when the clearance between the shut-off arm end and head deck is 6 mm (15/64″), and shut-off mechanism is released completely when it is (3/64″).
2. Adjust screw Ⓑ so that the clearance between shut-off levers (B) and (H) is 0.3∼0.6 mm (1/64″) in STOP mode.


1 mm (3/64″)
head deck (bottom view)
shut-off lever (H)
adjusting screw Ⓐ
shut-off arm
6 mm (15/64″)
0.3∼0.6 mm
shut-off lever (B)
shut-off lever holding plate ass'y
shut-off mechanism
release
adjusting screw Ⓑ
lock

Capstan Idler Position Adjustment

FWD mode


motor pulley
4.8 cm/s (1 7/8 ips)
to be flush
9.5 cm/s (3 3/4 ips)
To contact at center
flywheel
9.5 cm/s (3 3/4 ips)
19 cm/s (7 1/2 ips)
19 cm/s (7 1/2 ips)
to be some clearance
capstan idler
motor
1 mm (3/64″)


Adjust the height of the idler by loosening the screw.

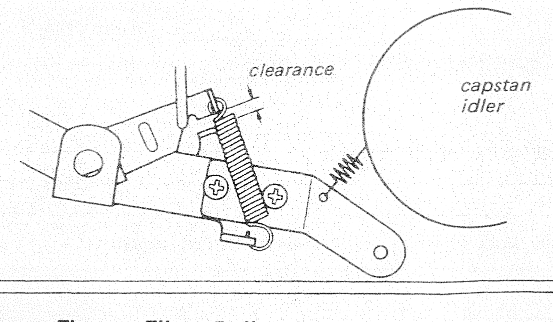
After adjustment, capstan idler should not come in contact with flywheel and 60 Hz motor pulley in STOP mode and the clearance between capstan idler and 50 Hz motor pulley is more than 3 mm (1/8″) in STOP mode.

Idler Arm (C) Stroke Check

FWD mode

At 4.8 cm/s (1 7/8 ips) tape speed:

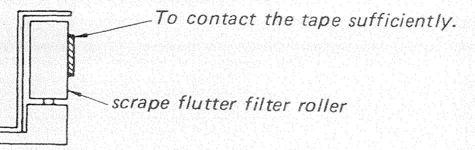
50 Hz	clearance is more than 0.6 mm (1/64″)
60 Hz	some clearance


clearance
capstan idler

Scrape Flutter Filter Roller Check

FWD mode

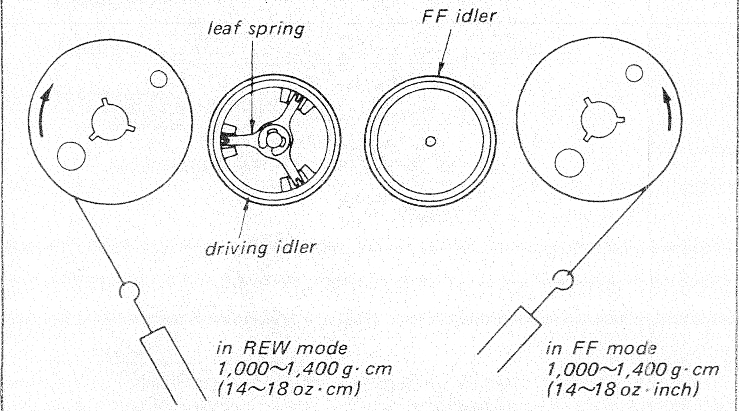
At 4.8 cm/s (1 7/8 ips) tape speed


To contact the tape sufficiently.
scrape flutter filter roller

FF and REW Torque Adjustment

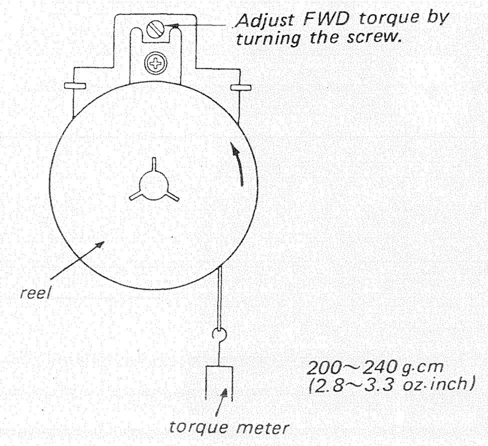
FF and REW modes

Adjust by changing the position of leaf spring to obtain the specified values on torque meter. (Read the values when driving idler is forced to stop the motion.)


leaf spring
FF idler
driving idler
in REW mode
1,000~1,400 g·cm
(14~18 oz·cm)
in FF mode
1,000~1,400 g·cm
(14~18 oz·inch)

FWD Torque Adjustment

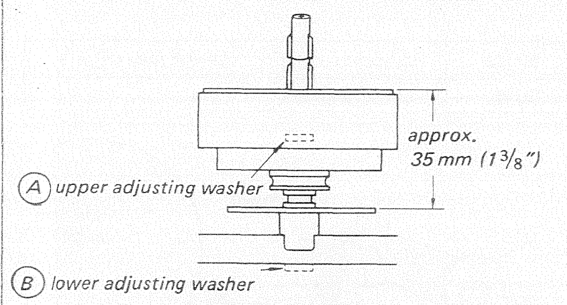
FWD mode

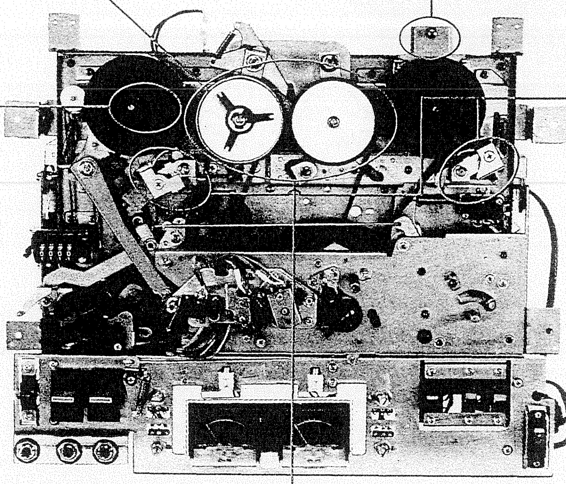

Adjust FWD torque by turning the screw.
reel
200~240 g·cm
(2.8~3.3 oz·inch)
torque meter

Reel Table Height Adjustment

FWD, REW & FF modes

1. Adjust the height of reel table by adding or removing the adjusting washers (Ⓐ, Ⓑ) so that tape does not come in contact with reel flange in FWD, REW & FF modes.
2. Perform tension regulator back-tension adjustment on page 9 and FWD torque adjustment.

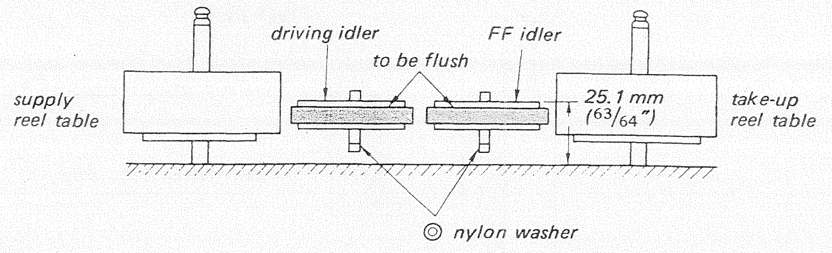

approx.
35 mm (1 3/8")
Ⓐ upper adjusting washer
Ⓑ lower adjusting washer



FF and Driving Idler Height Adjustment

STOP mode

Adjust the height of idler by adding or removing the nylon washer.

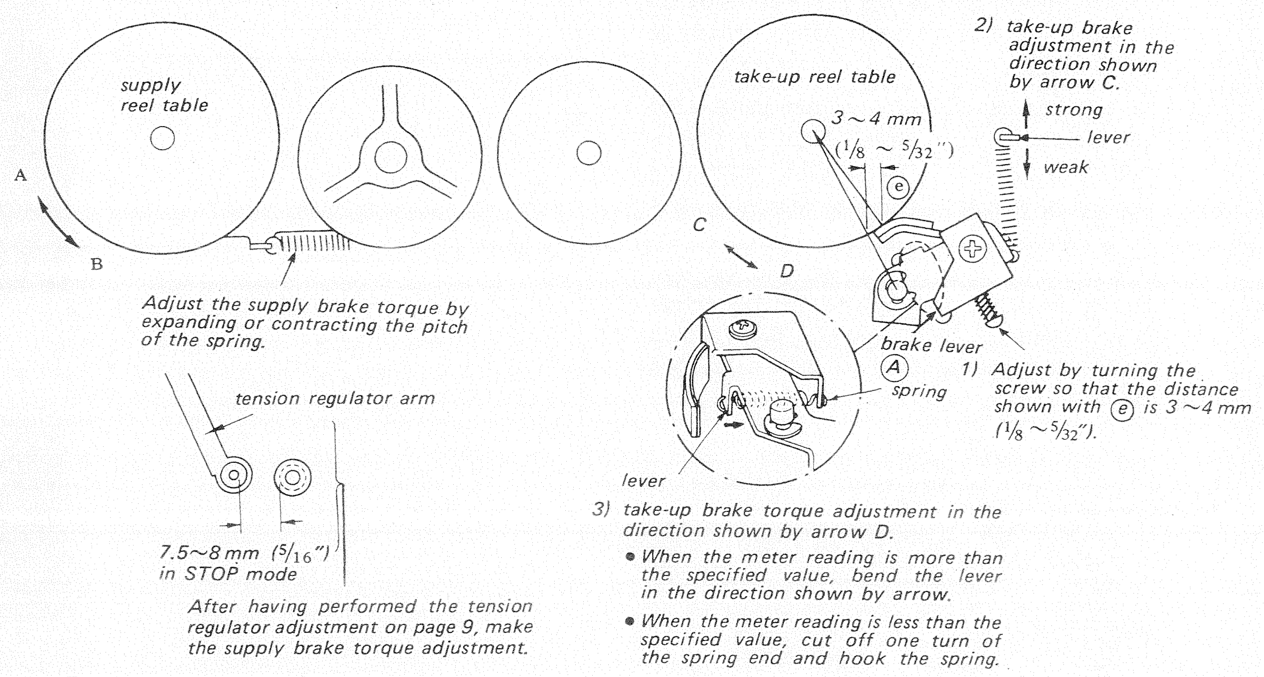

driving idler
FF idler
to be flush
supply
reel table
25.1 mm
(63/64")
take-up
reel table
◎ nylon washer

Brake Adjustment

STOP mode

supply brake torque	direction A	500~750 g·cm (6.96~10.4 oz·inch)
	direction B	1,000~1,800 g·cm (13.9~25 oz·inch)

take-up brake torque	direction C	400~550 g·cm (5.56~7.65 oz·inch)
	direction D	1,600~2,200 g·cm (22.2~30.6 oz·inch)


supply
reel table
A
B
take-up reel table
3~4 mm
(1/8 ~ 5/32")
ⓔ
C
D
strong
lever
weak
brake lever
Ⓐ
spring
lever
tension regulator arm
7.5~8 mm (5/16")
in STOP mode

Adjust the supply brake torque by expanding or contracting the pitch of the spring.

After having performed the tension regulator adjustment on page 9, make the supply brake torque adjustment.

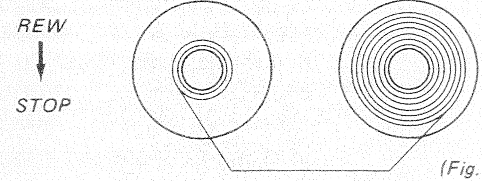
1) Adjust by turning the screw so that the distance shown with ⓔ is 3~4 mm (1/8 ~5/32").

2) take-up brake adjustment in the direction shown by arrow C.

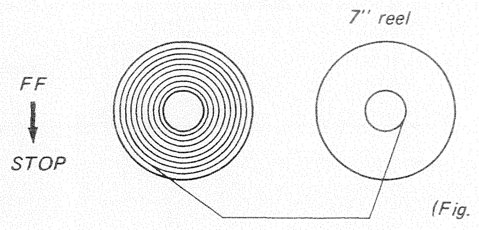
3) take-up brake torque adjustment in the direction shown by arrow D.
- When the meter reading is more than the specified value, bend the lever in the direction shown by arrow.
- When the meter reading is less than the specified value, cut off one turn of the spring end and hook the spring.

Tape Slack Check

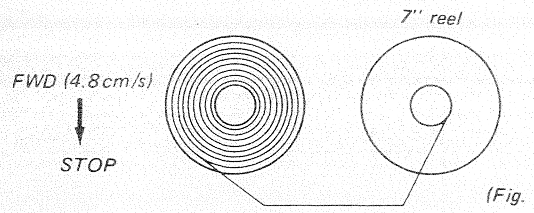
Place the machine in vertical position and thread tape with 7" reel.



(Fig. A)


7'' reel
FF
STOP

(Fig. B)


7'' reel
FWD (4.8 cm/s)
STOP

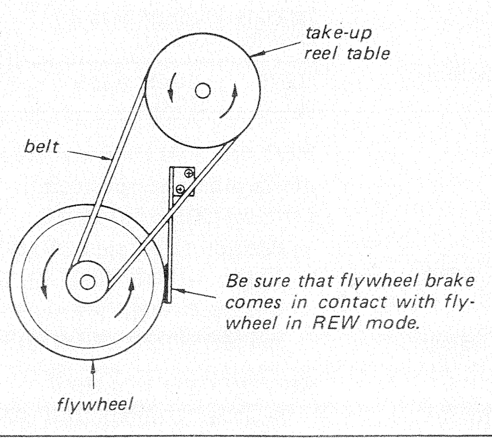
(Fig. C)

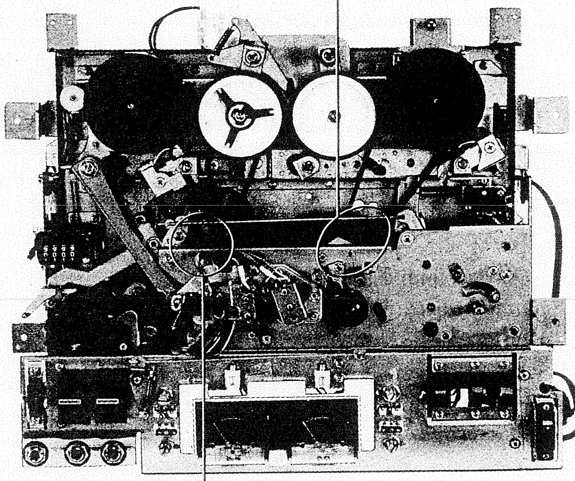
Be sure not to slack the tape in the following conditions.

Portion of Tape	Function Selector Knob
end portion of tape	REW → STOP (Fig. A)
beginning of tape	FF → STOP (Fig. B)
beginning of tape	Pull PAUSE lever in FWD mode at 19 cm/s (7 1/2 ips).
beginning of tape	FWD → STOP at 4.8 cm/s (1 7/8 ips) (Fig. C)

Flywheel Brake Check

REW mode


take-up
reel table
belt
Be sure that flywheel brake comes in contact with fly-wheel in REW mode.
flywheel

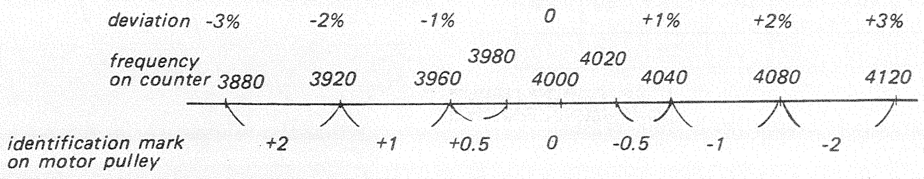


Tape Speed Adjustment

1. Playback SONY speed check tape (SPC-47) at 19 cm/s (7½ ips) tape speed in horizontal position. Read digital frequency counter connected to LINE OUT jack.
2. If the counter reading is out of 3,960 ~ 4,040 Hz, replace with the motor pulley with identification mark shown below.
(As for part No. of motor pulley, refer to page 28.)

SONY speed check tape SPC-47

no signal 4 min. ⟶ *4 kHz 2.5 min.* ⟶ *no signal 26 min.*


deviation -3% -2% -1% 0 +1% +2% +3%
frequency on counter 3880 3920 3960 3980 4000 4020 4040 4080 4120
identification mark on motor pulley +2 +1 +0.5 0 -0.5 -1 -2

	19cm/s (7½ ips)	9.5cm/s (3¾ ips)	4.8cm/s (1⅞ ips)
Deviation (%)	±1.5	±1.5	±1.5
Variation Limit (%)	1	1	1

3-2. ELECTRICAL ADJUSTMENTS/ MEASUREMENTS

Precaution:

1. Clean the following parts with an alcohol moistened swab:

record head	pinch roller
playback head	rubber belts
erase head	idlers
capstan	tape guides

2. Demagnetize record head and playback head with a head demagnetizer.
3. Do not use magnetized screwdriver for adjustments.
4. After adjustments, apply locking paint to the adjusted parts.
5. Adjustments should be performed in the order given in this service manual.
6. Adjustments and measurements should be performed for both L-CH and R-CH with rated power supply voltage unless otherwise specified.

Test Equipment/Tools Required:

audio oscillator (af osc)
VTVM
400 Hz bandpass filter
attenuator (600Ω)
non-magnetic screwdriver
wow meter
distortion meter
oscilloscope

resistors ....600Ω (¼W), 300Ω (¼W)
10 kΩ (¼W), 100 kΩ (¼W)

SONY test tape
J-19-F1

	1	2	3	4	5	6	7
Frequency (Hz)	10k	400	400	10k	7k	80	40
Level (dB)	−10	0	−10	−10	−10	−10	−10

blank tape (completely erased with bulk eraser)
{ SONY super 150
{ SONY SLH

Note: When connecting the measuring equipments to the input or the output jack of the machine, take the impedance matching correctly.

Input	Rated Input Level (Input Impedance)	Output	Rated Output Level (Load Impedance)
MICROPHONE	−60 dB, 0.78 mV (600Ω)	LINE OUT	0 dB, 0.78 V (100kΩ)
LINE IN	−10 dB, 0.25 V (10kΩ)		

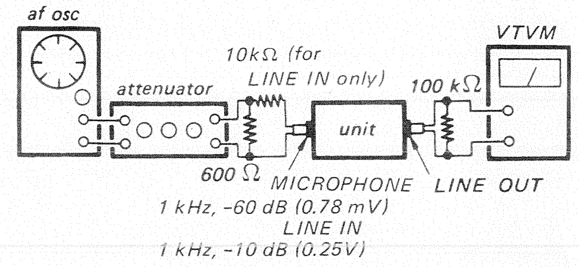
RECORD VOLUME control should be set as follows unless otherwise specified.

LINE RECORD VOLUME

Position to obtain 0 dB (0.78 V) LINE OUTput for 1 kHz, −10 dB (0.25 V) LINE INput with MIC RECORD VOLUME set to the minimum position and MONITOR switch set to SOURCE position.

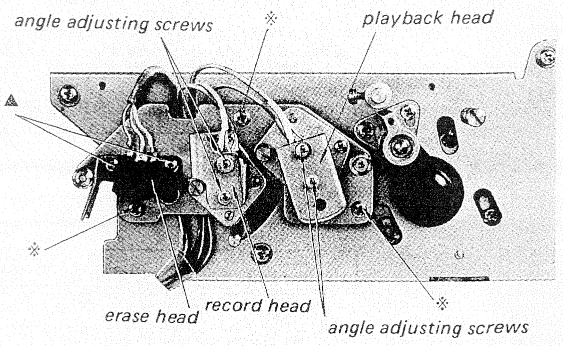
MIC RECORD VOLUME

Position to obtain 0 dB (0.78 V) LINE OUTput for 1 kHz, −60 dB (0.78 mV) MICROPHONE input with LINE RECORD VOLUME set to minimum position and MONITOR switch set to SOURCE position.



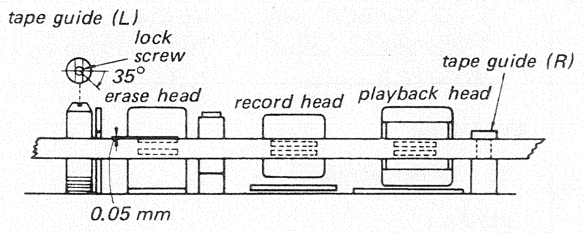
Note on replacing the heads:

1. Erase Head Removal
When removing the erase head from the head deck, remove the two screws shown with ▲.
(Do not remove the three screws shown below ※)
2. Record or P.B. Head Removal
When removing the record or the p.b. head, remove the respective angle adjusting screws. (Do not turn the screws except the angle adjusting screws.)



1. Tape Path Adjustment

A. Tape Guide (left) Adjustment


tape guide (L)
lock screw
35°
erase head
record head
playback head
tape guide (R)
0.05 mm

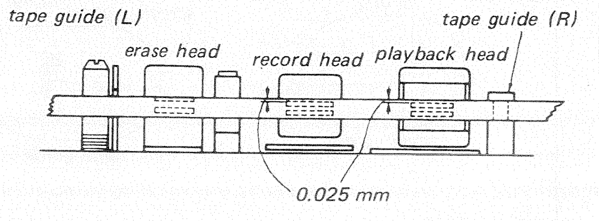
Procedure:

1. Thread a tape and place unit in playback mode.
2. Loosen the lock screw and align the upper edge of the erase head core and that of the tape by turning tape guide (L).
3. Turn tape guide (L) clockwise by approximately 35 degrees from the position obtained in the preceding step so that the upper edge of the tape is approximately 0.05 mm (2 mil) lower than the upper edge of the erase head core.
4. Fix the tape guide with the lock screw.

B. Record and Playback Head Preadjustment

(Rough adjustment for Playback Head Angle Adjustment and Playback Head Azimuth Adjustment)

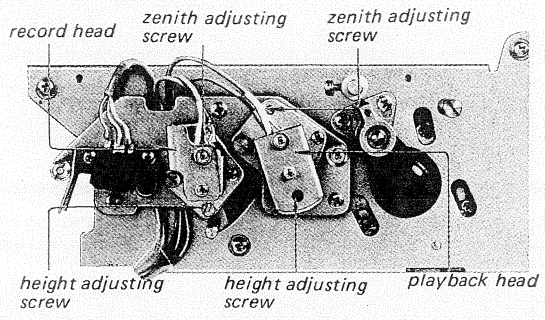
Note: This adjustment and the following adjustments (Playback Head Angle Adjustment and Playback Head Azimuth Adjustment) should be repeated alternately several times.

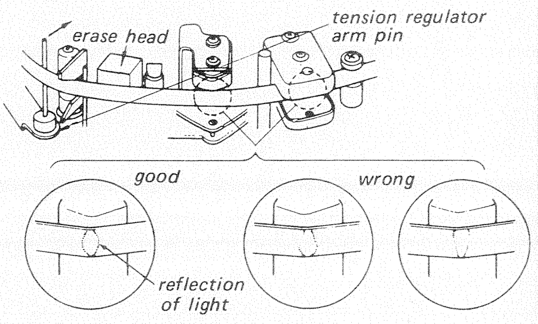

tape guide (L)
tape guide (R)
erase head
record head
playback head
0.025 mm

Procedure:

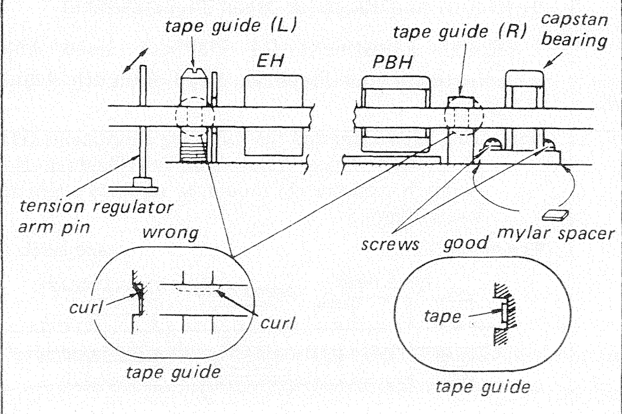
1. Align the upper edges of record and playback head cores and that of the tape by evenly turning the record and playback head height adjusting screws.
2. Turn record and playback head height adjusting screws clockwise by approximately 15 degrees so that the upper edges of record and playback head cores are 0.025 mm (1 mil) lower than that of the tape and memorize the angle of turns.
3. Turn zenith adjusting screws by the same angle of turns to the same direction of record and playback head height adjusting screws.
4. Thread SONY tape super 150 or PS-2 and place unit in playback mode at 19 cm/s (7½ ips).
5. Make the tape loose a little by pushing the tension regulator arm pin in the direction shown by arrow and then adjust playback head and record head zenith adjusting screws to obtain the reflection of light as shown.

Adjustment Location:


record head
zenith adjusting screw
zenith adjusting screw
height adjusting screw
height adjusting screw
playback head


erase head
tension regulator arm pin
good
wrong
reflection of light

2. Tape Curl Adjustment


tape guide (L)
EH
PBH
tape guide (R)
capstan bearing
tension regulator arm pin
wrong
screws
good
mylar spacer
curl
curl
tape guide
tape
tape guide

Procedure:

1. Thread SONY tape super 200 (thin tape) and place unit in playback mode at 4.8 cm/s (1 7/8 ips) tape speed.
2. Be sure that the tape comes in contact with two tape guides exactly as shown.
   a) If tape is curled at tape guide (L), adjust by bending tension regulator arm pin with fingers.
   b) If tape is curled at tape guide (R), loosen two capstan bearing holding screws and adjust by adding or removing the mylar spacer.

Note: After adding or removing the mylar spacer (0.1 mm thick), perform playback head zenith adjusting screw. (See "Record and Playback Head Preadjustment" on page 17.)

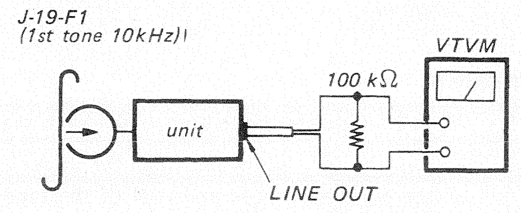
3. Playback Head Angle Adjustment

Control/Switch Setting:

TAPE SELECT switch:	NORMAL
TAPE SPEED selector:	7½ ips (19 cm/s)
MONITOR switch:	TAPE

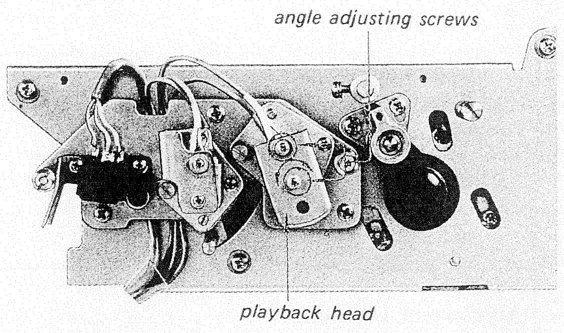
Procedure:

1. Mode: playback


J-19-F1
(1st tone 10kHz)
VTVM
100 kΩ
unit
LINE OUT

2. Adjust angle-adjusting screws for maximum VTVM reading.
3. Apply back-tension by holding lightly the supply reel table, reproducing the alignment tape, and then adjust the angle of the head by loosening two angle-adjusting screws so that VTVM reading on both L-CH and R-CH does not rise.

Note: Unless playback head is installed at correct angle, VTVM reading will rise.


angle adjusting screws
playback head

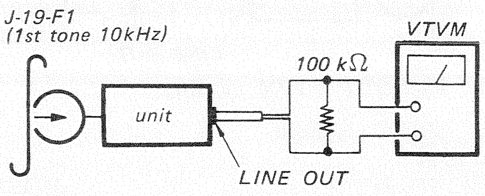
4. Playback Head Azimuth Adjustment

Control/Switch Setting:

TAPE SELECT switch:	NORMAL
TAPE SPEED selector:	7½ ips (19 cm/s)
MONITOR switch:	TAPE

Procedure:

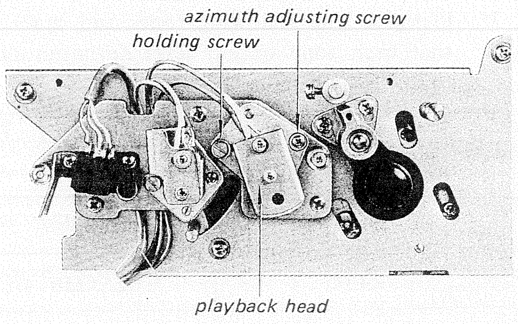
1. Be sure that playback head is fixed sufficiently to head deck with holding screw as shown below and tape path adjustment has been made.
2. Mode: playback


J-19-F1
(1st tone 10kHz)
VTVM
100 kΩ
unit
LINE OUT

3. Adjust azimuth adjusting screw for maximum VTVM reading.

Note: If azimuth angles of L-CH and R-CH are not the same, set the screw midway between two screw positions.

Adjustment Location:


azimuth adjusting screw
holding screw
playback head

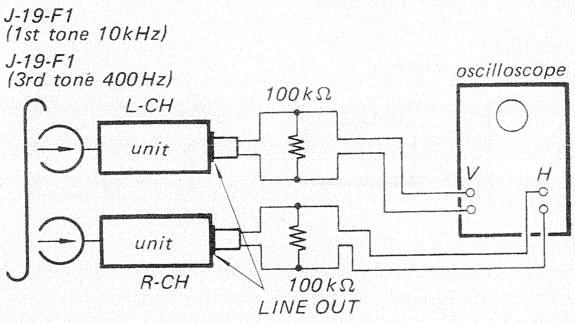
5. Playback Head Phase Check

Control/Switch Setting:

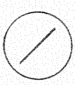
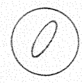
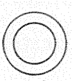
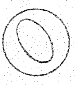
TAPE SELECT switch:	NORMAL
TAPE SPEED selector:	7½ ips (19 cm/s)
MONITOR switch:	TAPE

Procedure:

1. Mode: playback


J-19-F1
(1st tone 10kHz)
J-19-F1
(3rd tone 400Hz)
L-CH
100kΩ
oscilloscope
unit
V
H
unit
R-CH
100kΩ
LINE OUT

2.

Adjust	**On the oscilloscope**			
azimuth adjusting screw	 in-phase	 within 30°	 90°	 more than 90°
(400 Hz)	good	wrong		
(10 kHz)	good			wrong

Note: If necessary, finely adjust the playback head azimuth adjusting screw.

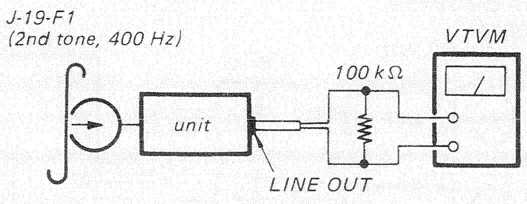
6. Playback Output Level Adjustment and Level Meter Calibration

Control/Switch Setting:

TAPE SELECT switch:	NORMAL
TAPE SPEED selector:	7½ ips (19 cm/s)
MONITOR switch:	TAPE

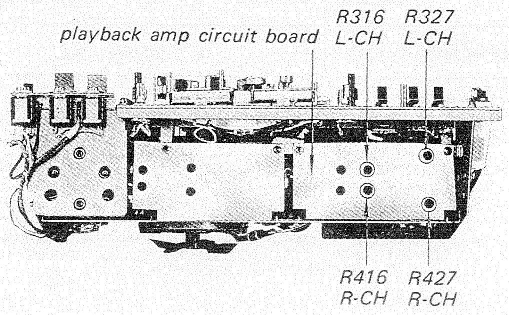
Procedure:

1. Mode: playback


J-19-F1
(2nd tone, 400 Hz)
VTVM
100 kΩ
unit
LINE OUT

2. Adjust R316, R416 for 0 dB (0.78V) VTVM reading.
3. Adjust R327, R427 for 0 reading on RECORD LEVEL meters.
4. Change TAPE SELECT switch to SPECIAL and be sure that VTVM reading is -2 dB~-3 dB (0.62~0.55V).

Adjustment Location:


playback amp circuit board
R316
L-CH
R327
L-CH
R416
R-CH
R427
R-CH

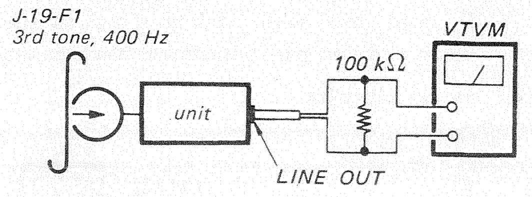
7. Playback Equalizer Adjustment

Control/Switch Setting:

TAPE SELECT switch:	NORMAL
TAPE SPEED selector:	7½ ips (19 cm/s)
MONITOR switch:	TAPE

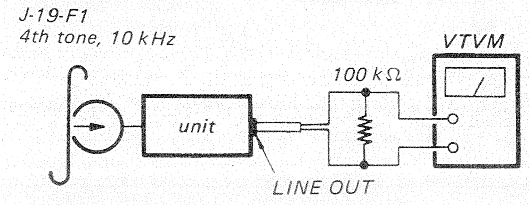
Procedure:

1. Mode: playback


J-19-F1
3rd tone, 400 Hz
VTVM
100 kΩ
unit
LINE OUT

Memorize VTVM reading.

2. Mode: playback

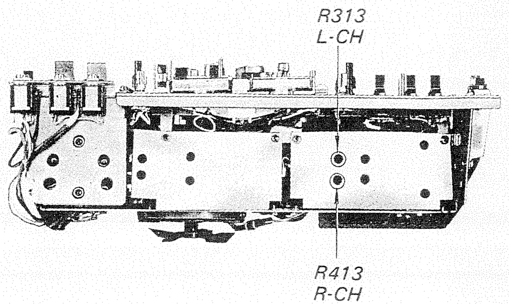

J-19-F1
4th tone, 10 kHz
VTVM
100 kΩ
unit
LINE OUT

Adjust R313, 413 to obtain the same VTVM reading as in step 1.

3. Playback the following tones and make sure that each tone output level deviation against 3rd tone is as follows.

	Tone	4th	5th	6th	7th
J-19-F1	Frequency (Hz)	10k	7k	80	40
Level Deviation from 3rd tone (400Hz)	L-CH	0±2dB	0±2dB	2±2dB	4±2dB
	R-CH			2.5±2dB	4.5±2dB

Adjustment Location:


R313
L-CH
R413
R-CH

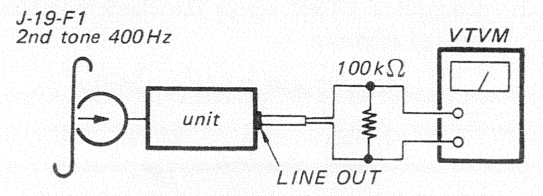
8. Playback S/N Ratio Check

Control/Switch Setting:

TAPE SELECT switch:	NORMAL
TAPE SPEED selector:	7½ ips (19 cm/s)
MONITOR switch:	TAPE

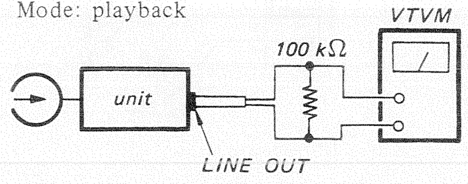
Procedure:

1. Mode: playback


J-19-F1
2nd tone 400 Hz
VTVM
100kΩ
unit
LINE OUT

2. VTVM reading should be 0 dB (0.78V). If not, make playback output level adjustment again.
3. With no tape threaded, keep on pushing shut-off lever with finger.

Mode: playback


VTVM
100 kΩ
unit
LINE OUT

4. Be sure that VTVM reading is less than –48 dB (3 mV).

Note: S/N ratio may change by reversing the sense of motor leads.

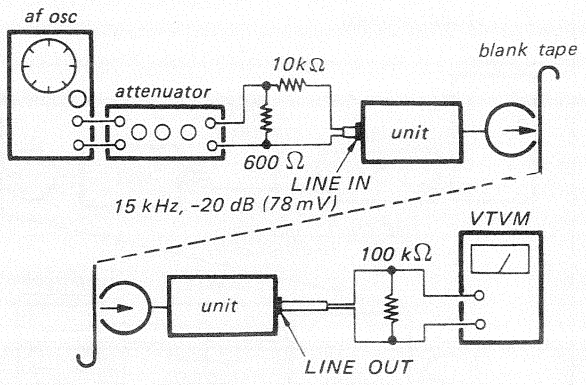
9. Record Head Azimuth and Track Position Adjustment

Control/Switch Setting:

TAPE SELECT switch:	NORMAL
TAPE SPEED selector:	7½ ips (19 cm/s)
MONITOR switch:	TAPE
LINE RECORD	
VOLUME control:	See page 16

Procedure:

1. Mode: record

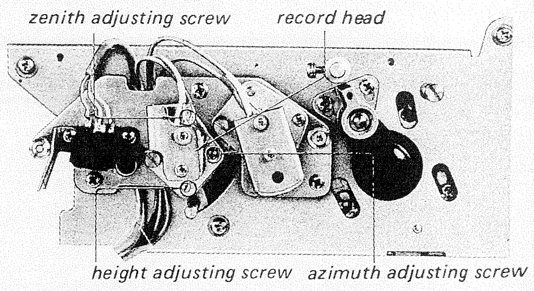

af osc
attenuator
10kΩ
600 Ω
LINE IN
blank tape
unit
15 kHz, -20 dB (78 mV)
VTVM
100 kΩ
unit
LINE OUT

2. Adjust azimuth adjusting screw for maximum VTVM reading.

   Note: If the maximum value of L-CH and R-CH outputs can not be obtained at the same angle, adjust the screw midway between two screw positions. (That value should not be fallen more than 1 dB from the maximum value.)

3. Supply a 1 kHz signal of –10 dB (0.24 V) into R-CH LINE IN jack and record the signal on the blank tape.
4. Adjust the height adjusting screw for maximum VTVM reading and memorize the angle of turns of the screw.
5. Turn the zenith adjusting screw by the same angle of turns obtained in preceding step 4.
6. After the adjustment, check tape path adjustment on page 17 again.

Adjustment Location:


zenith adjusting screw
record head
height adjusting screw
azimuth adjusting screw

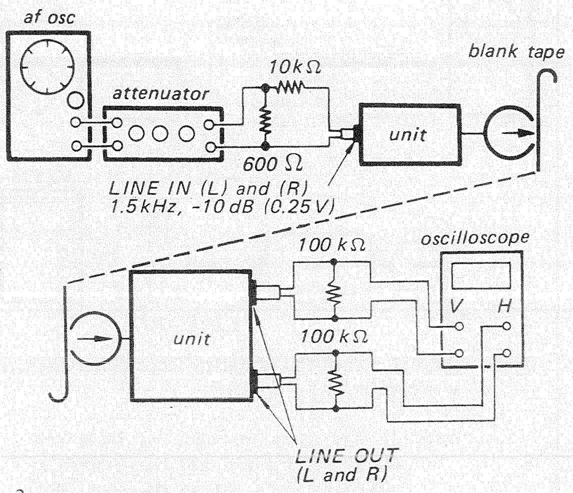
10. Record Head Phase Check

Control/Switch Setting:

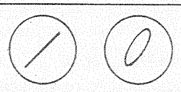
TAPE SELECT switch: NORMAL
TAPE SPEED selector: 7½ ips (19 cm/s)
MONITOR switch: TAPE
LINE RECORD
VOLUME control: See page 16

Procedure:

1. Make the playback head phase check on page 19 first.
2. Mode: record


af osc
attenuator
10kΩ
600 Ω
LINE IN (L) and (R)
1.5kHz, -10dB (0.25V)
unit
blank tape
100 kΩ
oscilloscope
V
H
unit
100 kΩ
LINE OUT
(L and R)

3.

Adjust	On the oscilloscope
azimuth adjusting screw	 in-phase within 30°

Note: If necessary, finely adjust record head azimuth adjusting screw.

11. Trap Coil Adjustment

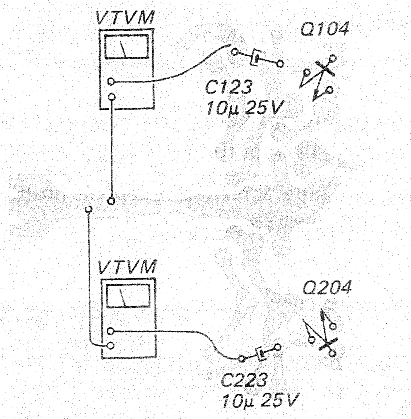
Control/Switch Setting:

TAPE SELECT switch: NORMAL
TAPE SPEED selector: 7½ ips (19 cm/s)
MIC RECORD
VOLUME control: MIN
(fully counterclockwise)

Procedure:

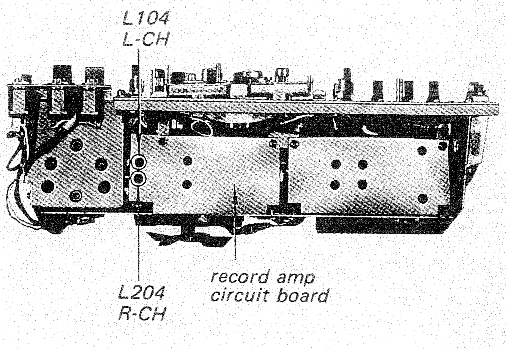
1. Connect a VTVM across the check point and ground as shown.

(RECORD AMP CIRCUIT BOARD)


VTVM
Q104
C123
10μ 25V
VTVM
Q204
C223
10μ 25V

2. Place unit in record mode without tape.
3. Adjust L104, L204 to obtain the minimum VTVM reading (less than -7 dB, 0.35V).

Adjustment Location:


L104
L-CH
L204
R-CH
record amp
circuit board

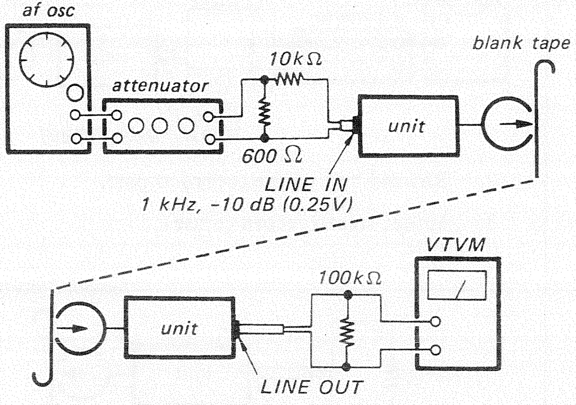
12. Record Bias Adjustment

Control/Switch Setting:

TAPE SELECT switch: NORMAL
TAPE SPEED selector: 7½ ips (19 cm/s)
MONITOR switch: TAPE
LINE RECORD
VOLUME control: See page 16

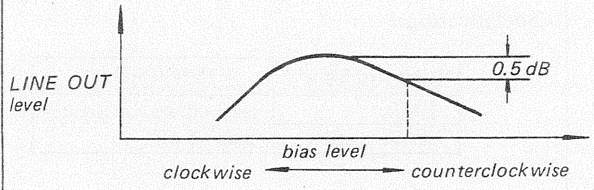
Procedure:

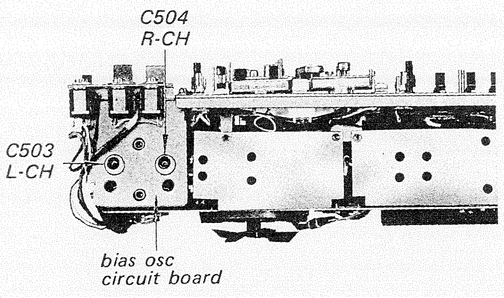
1. Be sure that trap coil adjustment has been made.
2. Mode: record


af osc
attenuator
10kΩ
600 Ω
unit
blank tape
LINE IN
1 kHz, -10 dB (0.25V)
VTVM
100kΩ
unit
LINE OUT

3. Turn the bias adjusting trimmer capacitors C503, C504 counterclockwise for maximum VTVM reading and then turn the capacitor counterclockwise so that VTVM reading drops 0.5 dB from the maximum value.
4. After the adjustment, be sure that voltage across record head is approximately 14V on VTVM and it decreases, as TAPE SPEED selector is changed to 3¾ ips (9.5 cm/s) and then $1^{7}/_{8}$ ips (4.8 cm/s).

Adjustment Location:




C504
R-CH
C503
L-CH
bias osc
circuit board

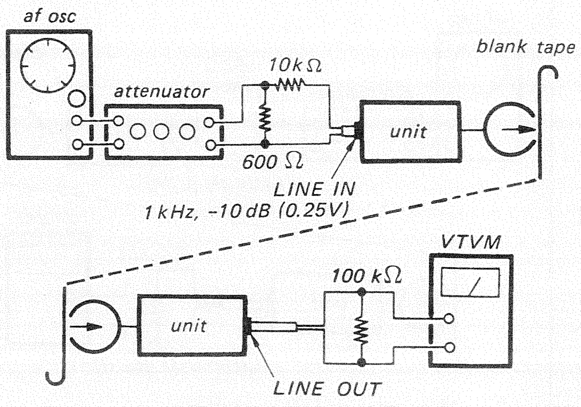
13. Record Level Adjustment

Control/Switch Setting:

TAPE SELECT switch: NORMAL
TAPE SPEED selector: 7½ ips (19 cm/s)
MONITOR switch: TAPE
LINE RECORD
VOLUME control: See page 16

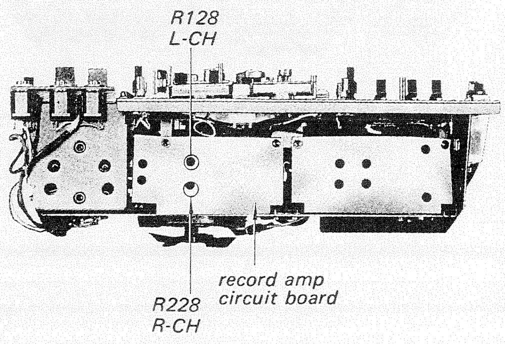
Procedure:

1. Mode: record


af osc
attenuator
10kΩ
600 Ω
unit
blank tape
LINE IN
1 kHz, -10 dB (0.25V)
VTVM
100 kΩ
unit
LINE OUT

2. Adjust R128, R228 for 0 dB (0.78V) VTVM reading.
3. Be sure that VTVM reading is 0 dB (0.78V) when changing MONITOR switch from TAPE to SOURCE position and the pointer of RECORD LEVEL meter stays at "0".
4. When TAPE SELECT switch is changed to SPECIAL with MONITOR switch to SOURCE, VTVM reading should decrease approx. 1.5 dB.

Adjustment Location:


R128
L-CH
record amp
circuit board
R228
R-CH

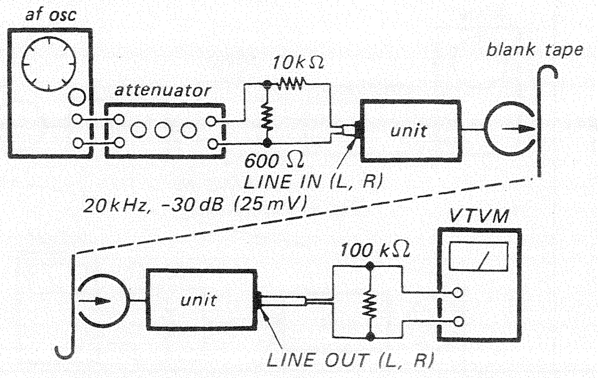
14. Dummy Coil Adjustment

Control/Switch Setting:

TAPE SELECT switch:	NORMAL
TPAE SPEED selector:	7½ ips (19 cm/s)
MONITOR switch:	TAPE
LINE RECORD VOLUME control:	See page 16

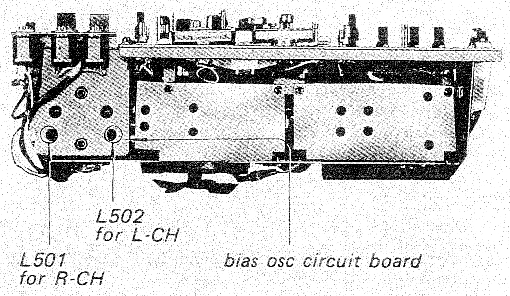
Procedure:

1. Mode: stereo record


af osc
attenuator
10kΩ
600 Ω
unit
blank tape
LINE IN (L, R)
20kHz, -30dB (25mV)
VTVM
100 kΩ
unit
LINE OUT (L, R)

2. Memorize VTVM readings.
3. Set L-channel (R-channel) only in record mode.
4. Adjust L502 (L501) with non-magnetic screwdriver, taking care not to break the core, so that VTVM reading is the same as that obtained in step 2.

Adjustment Location:


L502
for L-CH
L501
for R-CH
bias osc circuit board

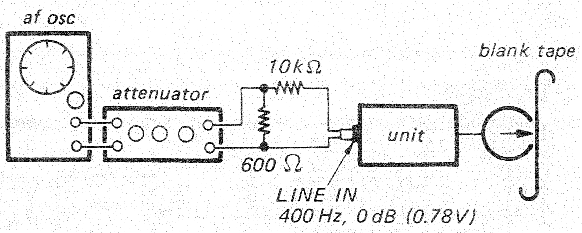
15. Erase Ratio Measurement

Control/Switch Setting:

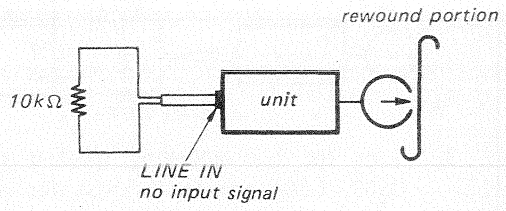
TAPE SELECT switch:	NORMAL
TAPE SPEED selector:	7½ ips (19 cm/s)
MONITOR switch:	TAPE
LINE RECORD VOLUME control:	See page 16

Procedure:

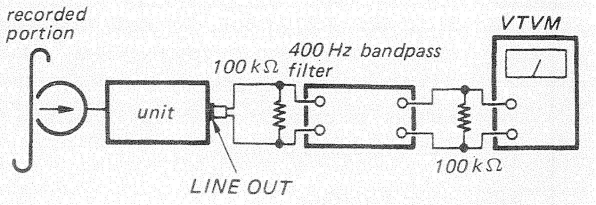
1. Mode: stereo record


af osc
attenuator
10kΩ
600 Ω
unit
blank tape
LINE IN
400Hz, 0dB (0.78V)

2. Rewind half of the recorded part.
3. Mode: stereo record (erase)


rewound portion
10kΩ
unit
LINE IN
no input signal

4. Mode: playback


recorded portion
unit
100kΩ
400 Hz bandpass filter
VTVM
100kΩ
LINE OUT

Specification:

Recorded Signal	VTVM Reading
1 kHz erased portion	level difference: greater than 65 dB

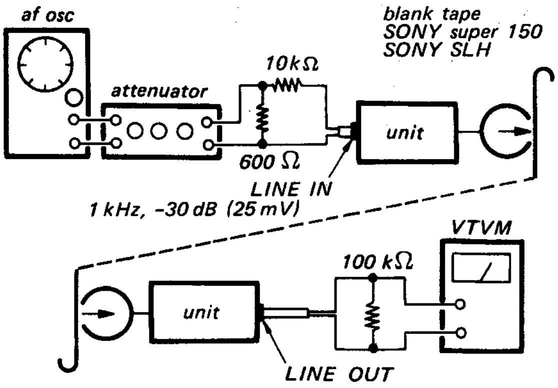
16. Overall Frequency Response Measurement

Control/Switch Setting:

TAPE SELECT switch:	NORMAL and SPECIAL
TAPE SPEED selector:	7½ ips (19 cm/s) 3¾ ips (9.5 cm/s) and 1⅞ ips (4.8 cm/s)
MONITOR switch:	TAPE
LINE RECORD VOLUME control:	See page 16

Procedure:

1. Mode: record


af osc
attenuator
10kΩ
600 Ω
unit
blank tape
SONY super 150
SONY SLH
LINE IN
1 kHz, -30 dB (25 mV)
VTVM
100 kΩ
unit
LINE OUT

2. Level Deviation from 1 kHz signal.
(for both SPECIAL and NORMAL)

Frequency / Tape speed	50 Hz	100 Hz	5kHz	7kHz	12.5kHz	20kHz
19 cm/s	±3 dB	±3	±3	±3	±3	+3 -4
9.5 cm/s	+3 -6	±3	±3	±3	+3 -4	
4.8 cm/s	+4 -5	+5 -1	+1 -6			

Note: When recording signal on SONY tape "super 150", set TAPE SELECT switch to NORMAL and on SONY SLH tape, to SPECIAL.

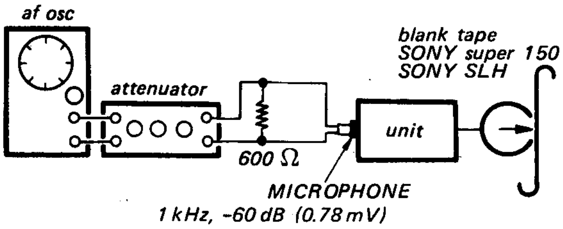
17. Overall S/N Ratio Measurement

Control/Switch Setting:

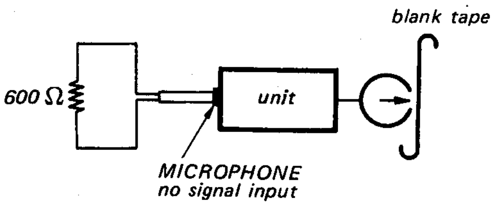
TAPE SELECT switch:	NORMAL and SPECIAL
TAPE SPEED selector:	7½ ips (19 cm/s)
MONITOR switch:	TAPE
MIC RECORD VOLUME control:	See page 16

Procedure:

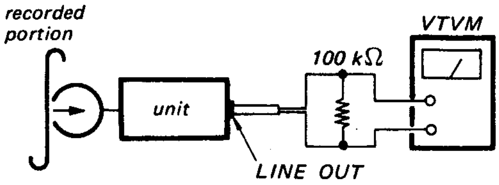
1. Mode: record


af osc
attenuator
600 Ω
unit
blank tape
SONY super 150
SONY SLH
MICROPHONE
1 kHz, -60 dB (0.78 mV)

2. Mode: record


blank tape
600 Ω
unit
MICROPHONE
no signal input

3. Mode: playback


recorded portion
VTVM
100 kΩ
unit
LINE OUT

Specification:

Recorded Signal	VTVM Reading	
	NORMAL	SPECIAL
1 kHz	level difference: greater than 45 dB	level difference: greater than 47 dB
no signal		

Note: When recording signal on SONY tape "super 150", set TAPE SELECT switch to NORMAL and on SONY SLH tape, to SPECIAL.

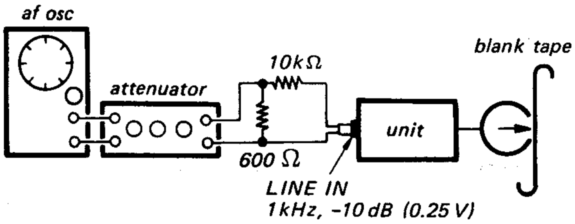
18. Overall Distortion Measurement

Control/Switch Setting:

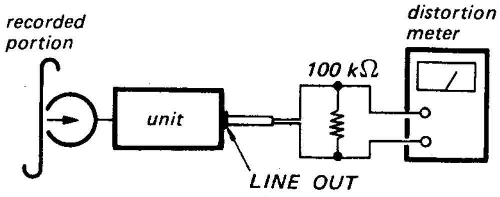
TAPE SELECT switch: NORMAL
TAPE SPEED selector: 7 ½ ips (19 cm/s)
MONITOR switch: TAPE
LINE RECORD
VOLUME control: See page 16

Procedure:

1. Mode: record


af osc
attenuator
10kΩ
600 Ω
unit
blank tape
LINE IN
1kHz, -10dB (0.25 V)

2. Mode: playback


recorded
portion
unit
100 kΩ
distortion
meter
LINE OUT

Specification: less than 1.5 %

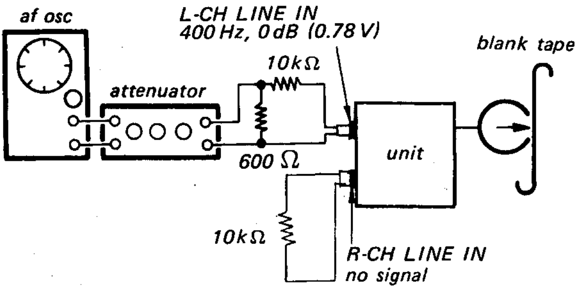
19. Cross-talk Measurement (between channels)

Control/Switch Setting:

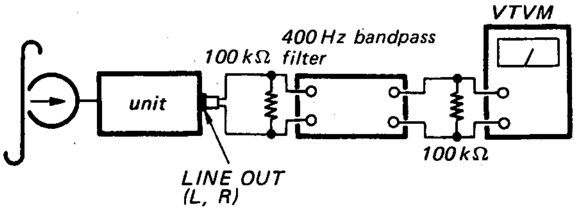
TAPE SELECT switch: NORMAL
TAPE SPEED selector: 7 ½ ips (19 cm/s)
MONITOR switch: TAPE
LINE RECORD
VOLUME control: See page 16

Procedure:

1. Mode: stereo record


af osc
L-CH LINE IN
400 Hz, 0 dB (0.78 V)
10kΩ
attenuator
600 Ω
unit
blank tape
10kΩ
R-CH LINE IN
no signal

2. Mode: playback


VTVM
400 Hz bandpass
100 kΩ filter
unit
100 kΩ
LINE OUT
(L, R)

Specification:

Playback	VTVM Reading
L-CH (400 Hz)	level difference: greater than 48 dB
R-CH (no signal)	

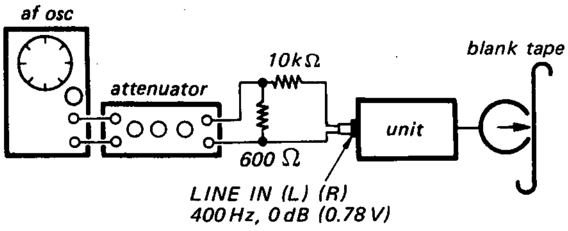
20. Cross-Talk Measurement (between tracks)

Control/Switch Setting:

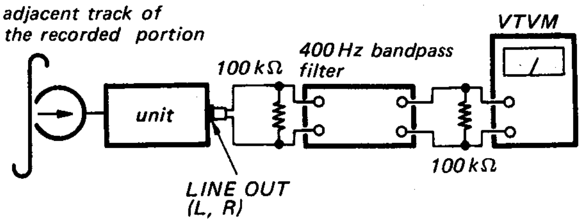
TAPE SELECT switch:	NORMAL
TAPE SPEED selector:	7 ½ ips (19 cm/s)
MONITOR switch:	TAPE
LINE RECORD VOLUME control:	See page 16

Procedure:

1. Mode: stereo record

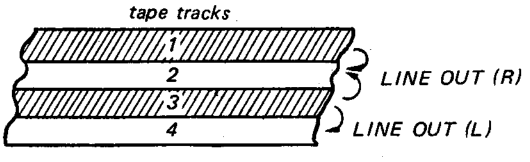

af osc
attenuator
10kΩ
600 Ω
unit
blank tape
LINE IN (L) (R)
400Hz, 0dB (0.78V)

2. Turn the reels over.
3. Mode: playback


adjacent track of
the recorded portion
100kΩ
400Hz bandpass
filter
VTVM
unit
100kΩ
LINE OUT
(L, R)

Specification:

Playback	VTVM reading
400 Hz	level difference: greater than 65 dB
adjacent track of the recorded portion	


tape tracks
1
2
3
4
LINE OUT (R)
LINE OUT (L)

21. Minimum Input Level Check

Control/Switch Setting:

MONITOR switch:	SOURCE

Procedure:

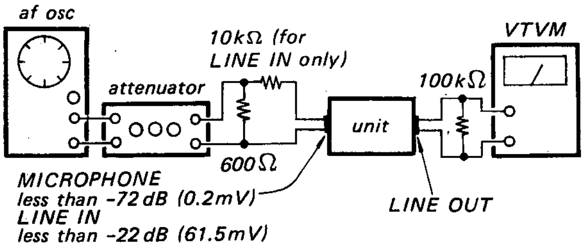
A. MICROPHONE Jack Level Check

1. Set LINE RECORD VOLUME to MIN and MIC RECORD VOLUME to MAX position.
2. Supply 1 kHz signal into MICROPHONE jack and adjust attenuator to obtain 0 dB (0.78 V) VTVM reading.
3. Be sure that MICROPHONE jack level is less than -72 dB (0.2 mV).

B. LINE IN Jack Level Check

1. Set MIC RECORD VOLUME to MIN and LINE RECORD VOLUME to MAX position.
2. Supply 1 kHz signal into LINE IN jack and adjust attenuator to obtain 0 dB (0.78 V) VTVM reading.
3. Be sure that LINE IN jack level is less than -22 dB (61.5 mV).

Mode: record

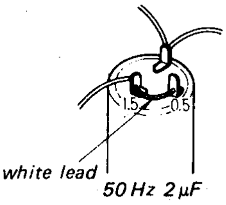

af osc
10kΩ (for
LINE IN only)
attenuator
600Ω
unit
100kΩ
VTVM
MICROPHONE
less than -72dB (0.2mV)
LINE IN
less than -22dB (61.5mV)
LINE OUT

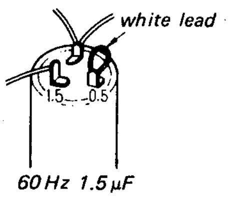
3-3. POWER FREQUENCY ADAPTATION

The motor pulley and tapping of the motor capacitor terminals must be changed, if the line frequency differs from what the recorder is set for.

To change connection of the motor capacitor terminals

The motor capacitor is located at the upper side of the drive mechanism. Change the connection of the motor capacitor terminals by soldering as illustrated.

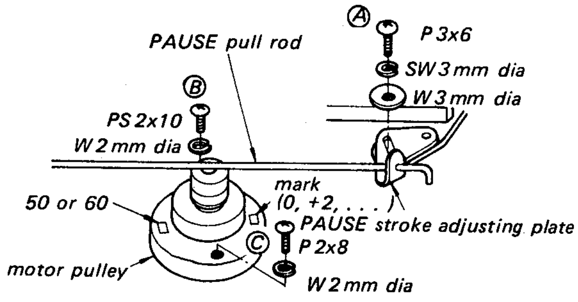

1.5
0.5
white lead
50 Hz 2 μF


white lead
1.5
0.5
60 Hz 1.5 μF

To change motor pulley

Remove the top panel as described in DISASSEMBLY on page 6.

1. Remove PAUSE adjusting plate by loosening the screw Ⓐ . Withdraw PAUSE pull rod.
2. Remove rubber belt from the motor pulley and idler wheel.
3. Remove motor pulley by loosening two screws Ⓑ and Ⓒ which hold motor pulley.
4. Use the supplied motor pulley with same mark and tighten the screws.

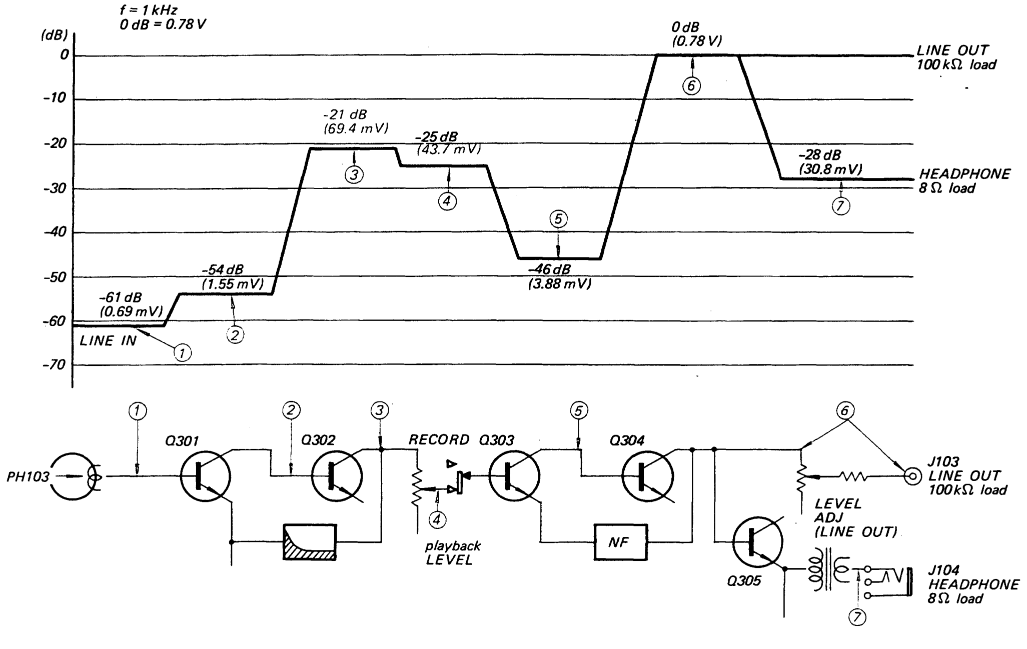

Ⓐ
P 3x6
SW 3 mm dia
W 3 mm dia
PAUSE pull rod
Ⓑ
PS 2x10
W 2 mm dia
mark
(0, +2, . . .)
50 or 60
PAUSE stroke adjusting plate
Ⓒ
P 2x8
motor pulley
W 2 mm dia

Motor Pulley Part No.			
for 50 Hz		for 60 Hz	
Mark on Motor Pulley	Part No.	Mark on Motor Pulley	Part No.
+2	3-518-067-61	+2	3-518-068-61
+1	3-518-067-51	+1	3-518-068-51
+0.5	3-518-067-41	+0.5	3-518-068-41
0	3-518-067-01	0	3-518-068-01
-0.5	3-518-067-11	-0.5	3-518-068-11
-1	3-518-067-21	-1	3-518-068-21
-2	3-518-067-31	-2	3-518-068-31

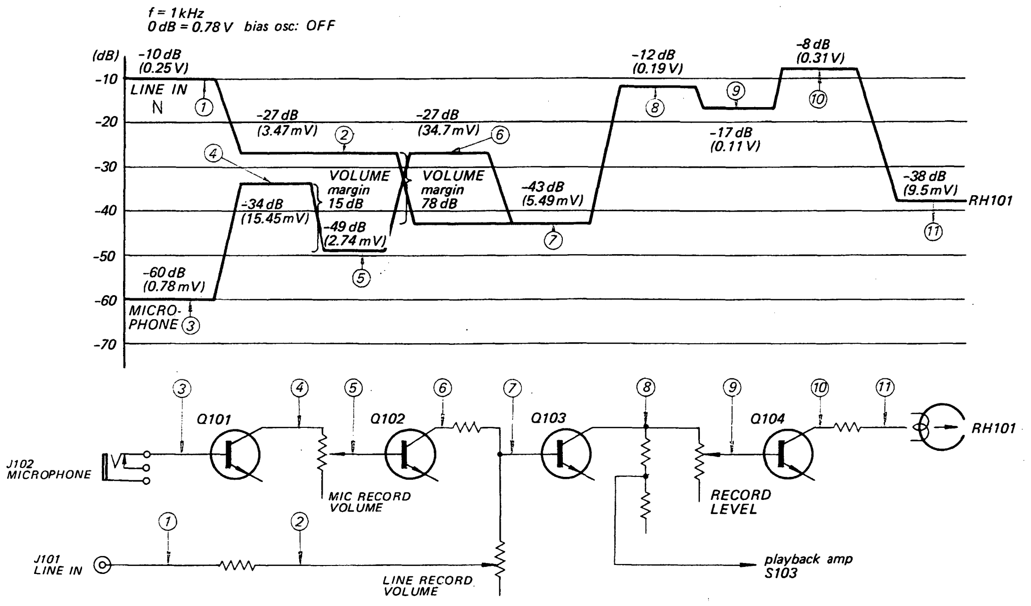
SECTION 4
DIAGRAMS

4-1. LEVEL DIAGRAMS

Playback

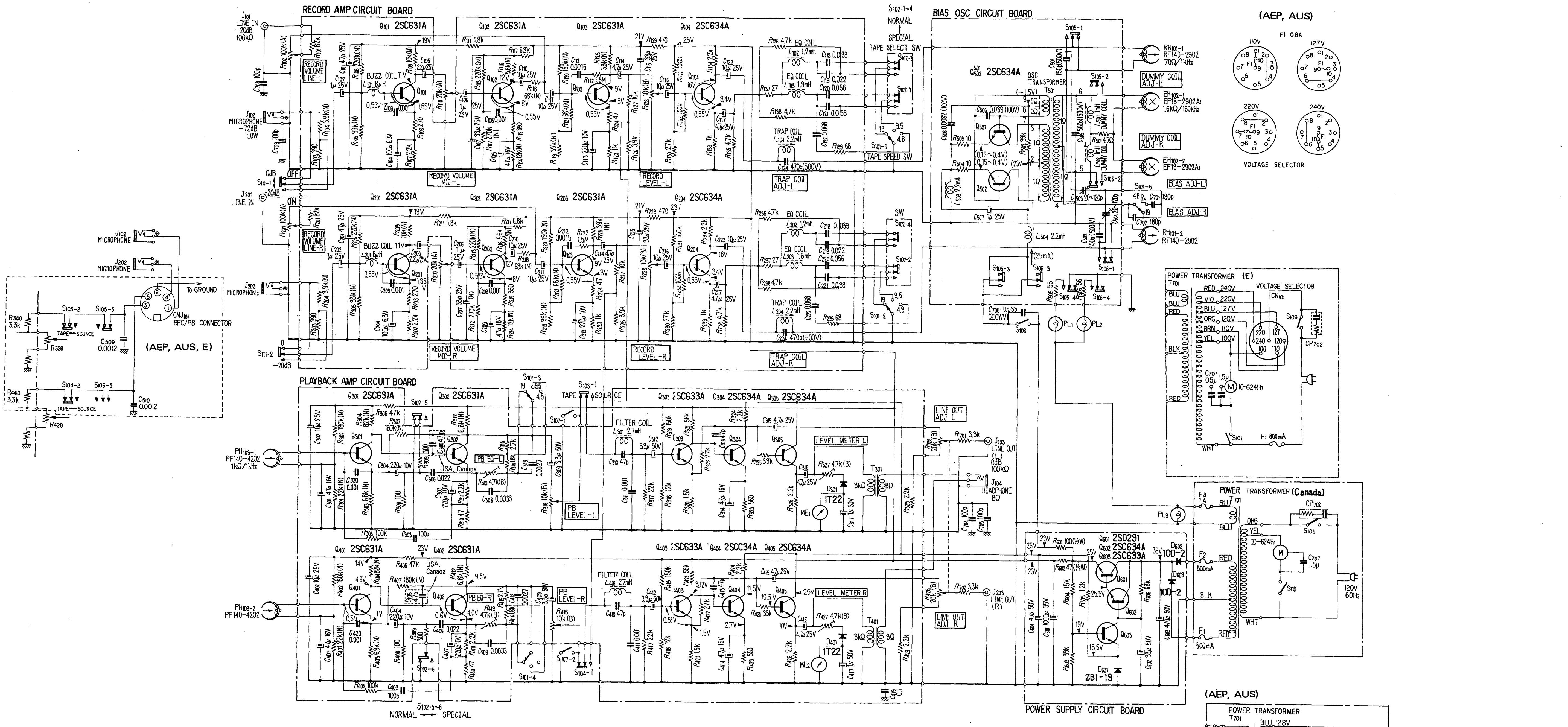


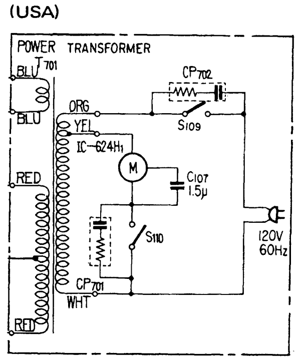
Record

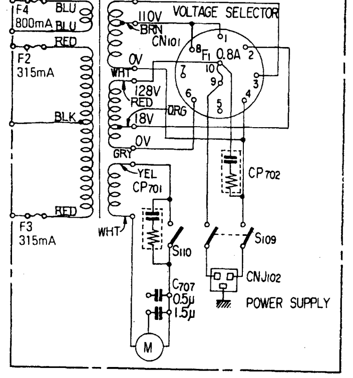


MEMO

4-2. SCHEMATIC DIAGRAM


RECORD AMP CIRCUIT BOARD
BIAS OSC CIRCUIT BOARD
PLAYBACK AMP CIRCUIT BOARD
POWER SUPPLY CIRCUIT BOARD
Q101 2SC631A
Q102 2SC631A
Q103 2SC631A
Q104 2SC634A
Q201 2SC631A
Q202 2SC631A
Q203 2SC631A
Q204 2SC634A
Q301 2SC631A
Q302 2SC631A
Q303 2SC633A Q304 2SC634A Q305 2SC634A
Q401 2SC631A
Q402 2SC631A
Q403 2SC633A Q404 2SC634A Q405 2SC634A
Q501 Q502 2SC634A
Q601 2SD291
Q602 2SC634A
Q603 2SC633A
J101 LINE IN −20dB 100kΩ
J102 MICROPHONE −72dB LOW
J201 LINE IN
J202 MICROPHONE
J103 LINE OUT (L) 0dB 100kΩ
J104 HEADPHONE 8Ω
J203 LINE OUT (R)
CNJ101 REC/PB CONNECTOR
(AEP, AUS, E)
To GROUND
RECORD VOLUME LINE-L
RECORD VOLUME LINE-R
RECORD VOLUME MIC-L
RECORD VOLUME MIC-R
RECORD LEVEL-L
RECORD LEVEL-R
TRAP COIL ADJ-L
TRAP COIL ADJ-R
BUZZ COIL
EQ COIL
TRAP COIL
S102-1~4 NORMAL SPECIAL TAPE SELECT SW
TAPE SPEED SW
OSC TRANSFORMER T501
DUMMY COIL ADJ-L
DUMMY COIL ADJ-R
BIAS ADJ-L
BIAS ADJ-R
RH101-1 RF140-2902 70Ω/1kHz
EH102-1 EF18-2902A1 1.6kΩ/160kHz
EH102-2 EF18-2902A1
RH101-2 RF140-2902
PH103-1 PF140-4202 1kΩ/1kHz
PH103-2 PF140-4202
FILTER COIL
PB EQ-L
PB EQ-R
PB LEVEL-L
PB LEVEL-R
LEVEL METER L
LEVEL METER R
LINE OUT ADJ L
LINE OUT ADJ R
TAPE SOURCE
S102-5~6 NORMAL SPECIAL
(AEP, AUS)
VOLTAGE SELECTOR
110V 127V 220V 240V
POWER TRANSFORMER (E)
POWER TRANSFORMER (Canada)
IC-624H1
120V 60Hz
D601 ZB1-19
10D-2


(USA)
POWER TRANSFORMER T701
CP702
S109
IC-624H1
C107 1.5μ
S110
120V 60Hz
CP701


POWER TRANSFORMER T701
VOLTAGE SELECTOR
F4 800mA
F2 315mA
F3 315mA
CP702
S109
CP701
S110
C707 0.5μ 1.5μ
CNJ102
POWER SUPPLY

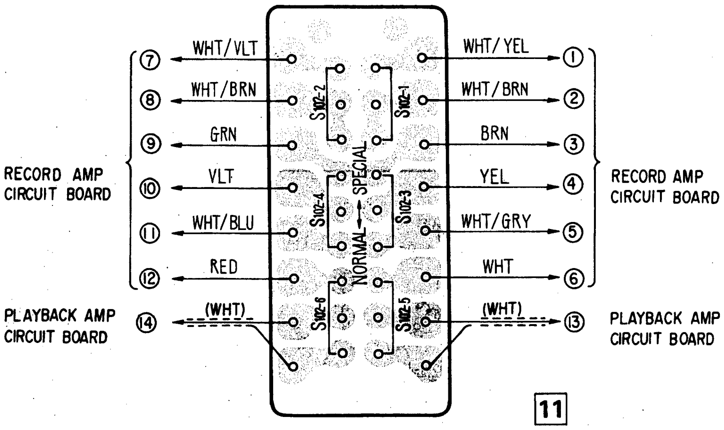
Note:

1. All resistors and capacitors are rated in Ω and μF, unless otherwise specified.
2. The letter (A), (B) suffixed to rating value of variable or adjustable resistor indicates its characteristics.
3. Voltage values shown are measured with a voltmeter (20 kΩ/V) in playback mode.
   Voltage and current values in ( ) are measured in record mode.
   Variations may be noted because of normal production tolerances.
4. Symbols
   ⏚ : Chassis ground
   (N) : Low noise resistor
5. Switch position

Ref. No.	Description	Position
S101	TAPE SPEED	19 cm/sec (7½ ips)
S102	TAPE SELECT	NORMAL
S103	MONITOR (L-CHANNEL)	TAPE
S104	MONITOR (R-CHANNEL)	TAPE
S105	record/playback (L-channel)	playback
S106	record/playback (R-channel)	playback
S107	muting	OFF
S108	bias osc	OFF
S109	POWER	OFF
S110	auto shut-off	OFF
S111	MIC ATT	OFF

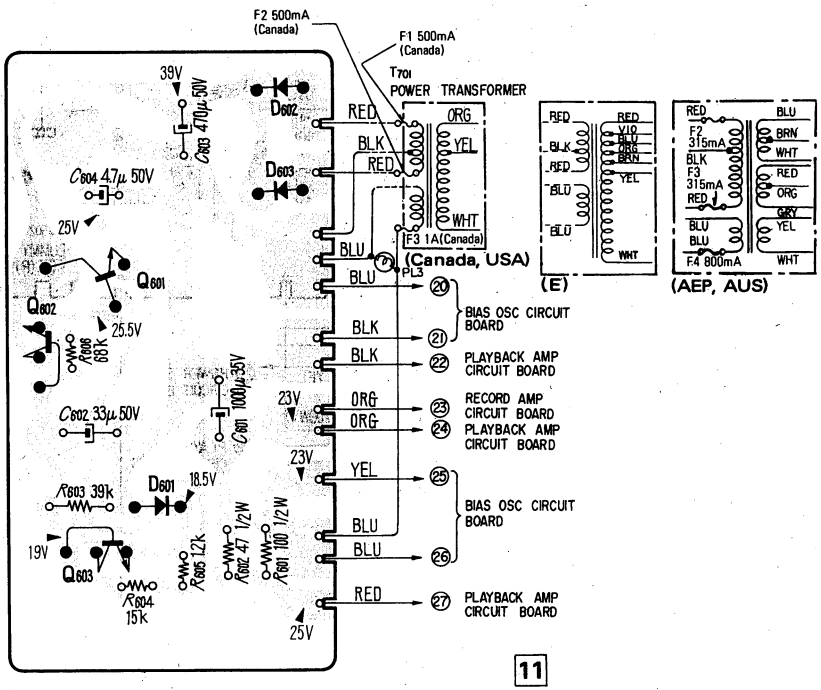
4-3. MOUNTING DIAGRAMS

4-3-1. Tape Select Switch Circuit Board

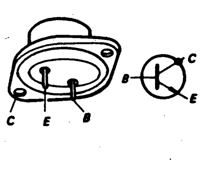

⑦ WHT/VLT
⑧ WHT/BRN
⑨ GRN
⑩ VLT
⑪ WHT/BLU
⑫ RED
RECORD AMP CIRCUIT BOARD
⑭ (WHT)
PLAYBACK AMP CIRCUIT BOARD
S102-2
S102-1
S102-4
S102-3
S102-6
S102-5
NORMAL ←→ SPECIAL
WHT/YEL ①
WHT/BRN ②
BRN ③
YEL ④
WHT/GRY ⑤
WHT ⑥
RECORD AMP CIRCUIT BOARD
(WHT) ⑬
PLAYBACK AMP CIRCUIT BOARD
11

4-3-2. Power Supply Circuit Board

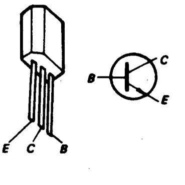
Conductor Side


F2 500mA (Canada)
F1 500mA (Canada)
T701 POWER TRANSFORMER
39V
C603 470μ 50V
D602
D603
C604 4.7μ 50V
25V
Q601
Q602
25.5V
R606 68k
C602 33μ 50V
C601 1000μ 35V
23V
23V
R603 39k
D601
18.5V
19V
Q603
R604 15k
R605 1.2k
R602 47 1/2W
R601 100 1/2W
25V
RED
BLK
RED
ORG
YEL
WHT
F3 1A(Canada)
(Canada, USA)
PL3
BLU
BLU ⑳
BLK ㉑
BIAS OSC CIRCUIT BOARD
BLK ㉒
PLAYBACK AMP CIRCUIT BOARD
ORG ㉓
RECORD AMP CIRCUIT BOARD
ORG ㉔
PLAYBACK AMP CIRCUIT BOARD
YEL ㉕
BIAS OSC CIRCUIT BOARD
BLU
BLU ㉖
RED ㉗
PLAYBACK AMP CIRCUIT BOARD
RED
BLK
RED
BLU
BLU
RED
VIO
BLU
ORG
BRN
YEL
WHT
(E)
RED
F2 315mA
BLK
F3 315mA
RED
BLU
BLU
F4 800mA
BLU
BRN
WHT
RED
ORG
GRY
YEL
WHT
(AEP, AUS)
11

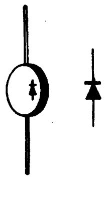
Q601: 2SD291



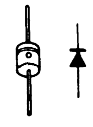
Q602: 2SC634A
Q603: 2SC633A



D601: ZB1-19

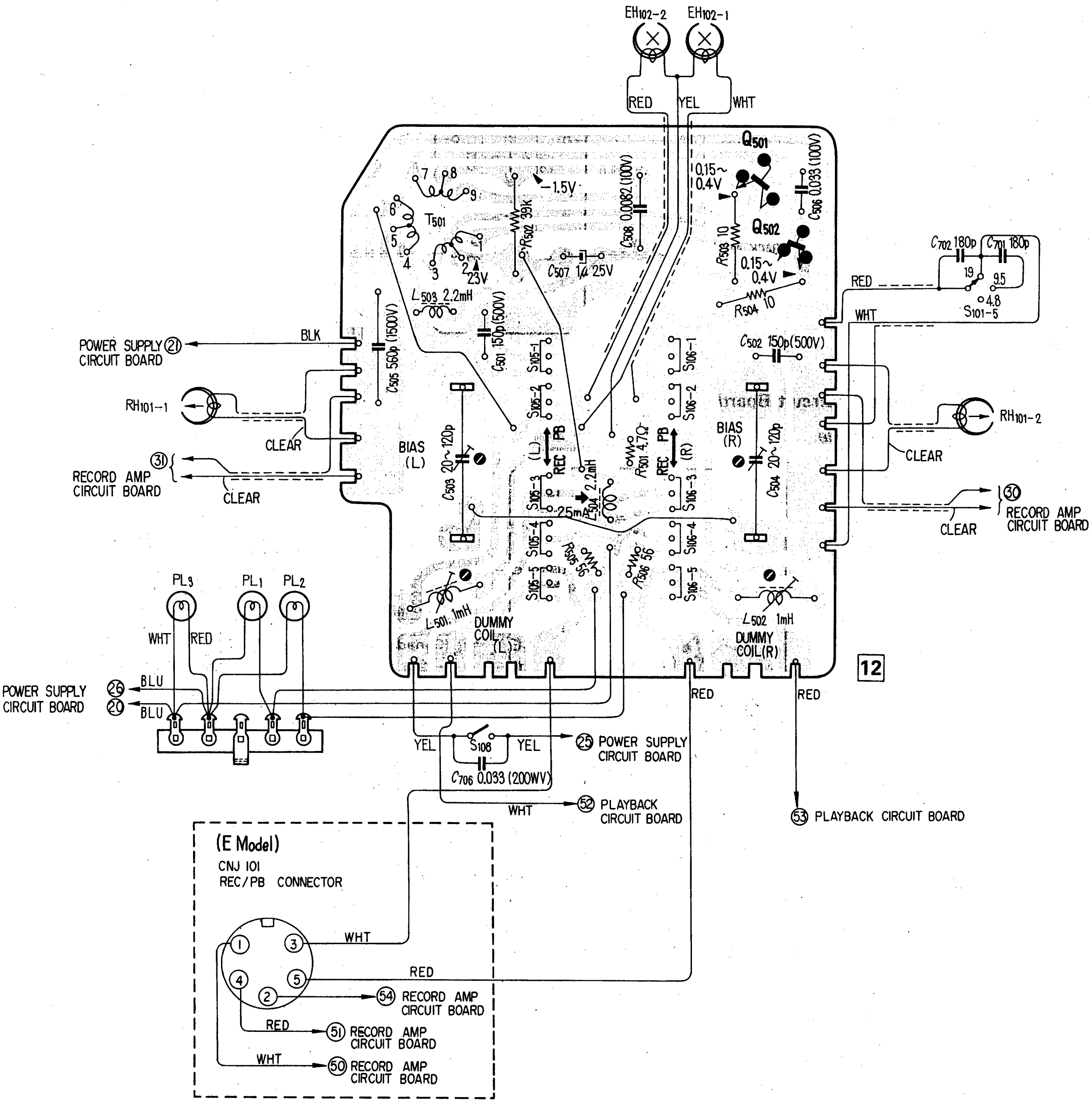


D602, 603: 10D-2

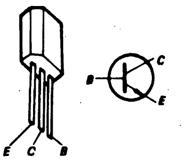


4-3-3. Bias Osc Circuit Board

Conductor Side

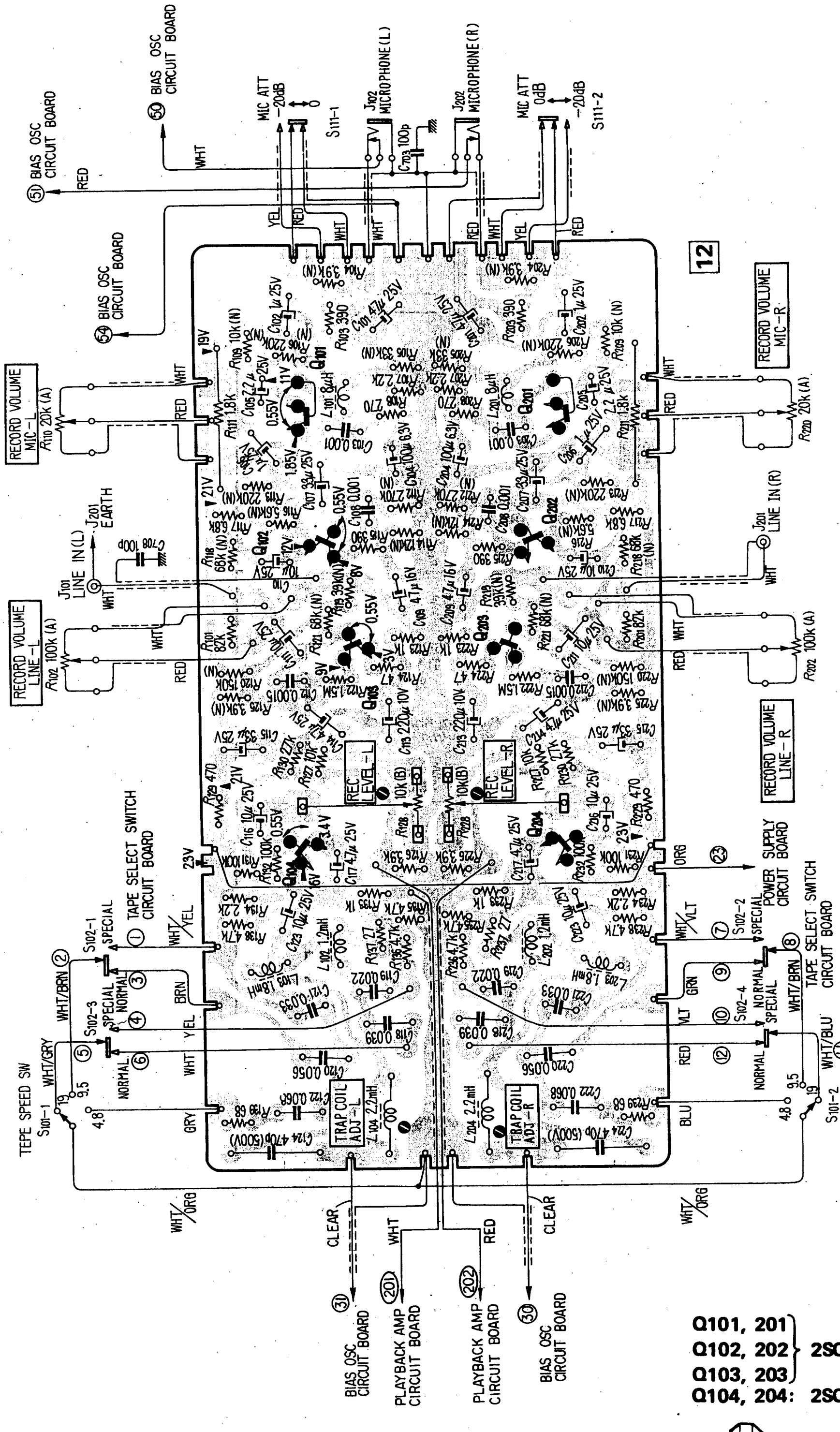

EH102-2
EH102-1
RED
YEL
WHT
Q501
Q502
C506 0.033 (100V)
0.15~ 0.4V
R503 10
R504 10
C508 0.0082 (100V)
C507 1/4 25V
-1.5V
T501
23V
R502 39K
L503 2.2mH
C501 150p(500V)
C505 560p (1500V)
C702 180p
C701 180p
19
9.5
4.8
S101-5
C502 150p(500V)
BLK
POWER SUPPLY ㉑ CIRCUIT BOARD
RH101-1
RH101-2
CLEAR
㉛ RECORD AMP CIRCUIT BOARD
㉚ RECORD AMP CIRCUIT BOARD
BIAS (L)
BIAS (R)
C503 20~120p
C504 20~120p
S105-1
S105-2
S105-3
S105-4
S105-5
S106-1
S106-2
S106-3
S106-4
S106-5
REC
PB
(L)
(R)
R501 4.7Ω
L504 2.2mH
25mA
R505 56
R506 56
L501 1mH
L502 1mH
DUMMY COIL (L)
DUMMY COIL (R)
12
PL3
PL1
PL2
BLU
POWER SUPPLY CIRCUIT BOARD ㉖ ⑳
YEL
S108
C706 0.033 (200WV)
㉕ POWER SUPPLY CIRCUIT BOARD
(52) PLAYBACK CIRCUIT BOARD
(53) PLAYBACK CIRCUIT BOARD
(E Model)
CNJ 101
REC/PB CONNECTOR
(54) RECORD AMP CIRCUIT BOARD
(51) RECORD AMP CIRCUIT BOARD
(50) RECORD AMP CIRCUIT BOARD

Q501, 502: 2SC634A

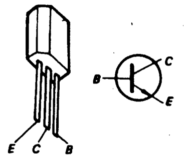


4-3-4. Record Amp Circuit Board

Conductor Side

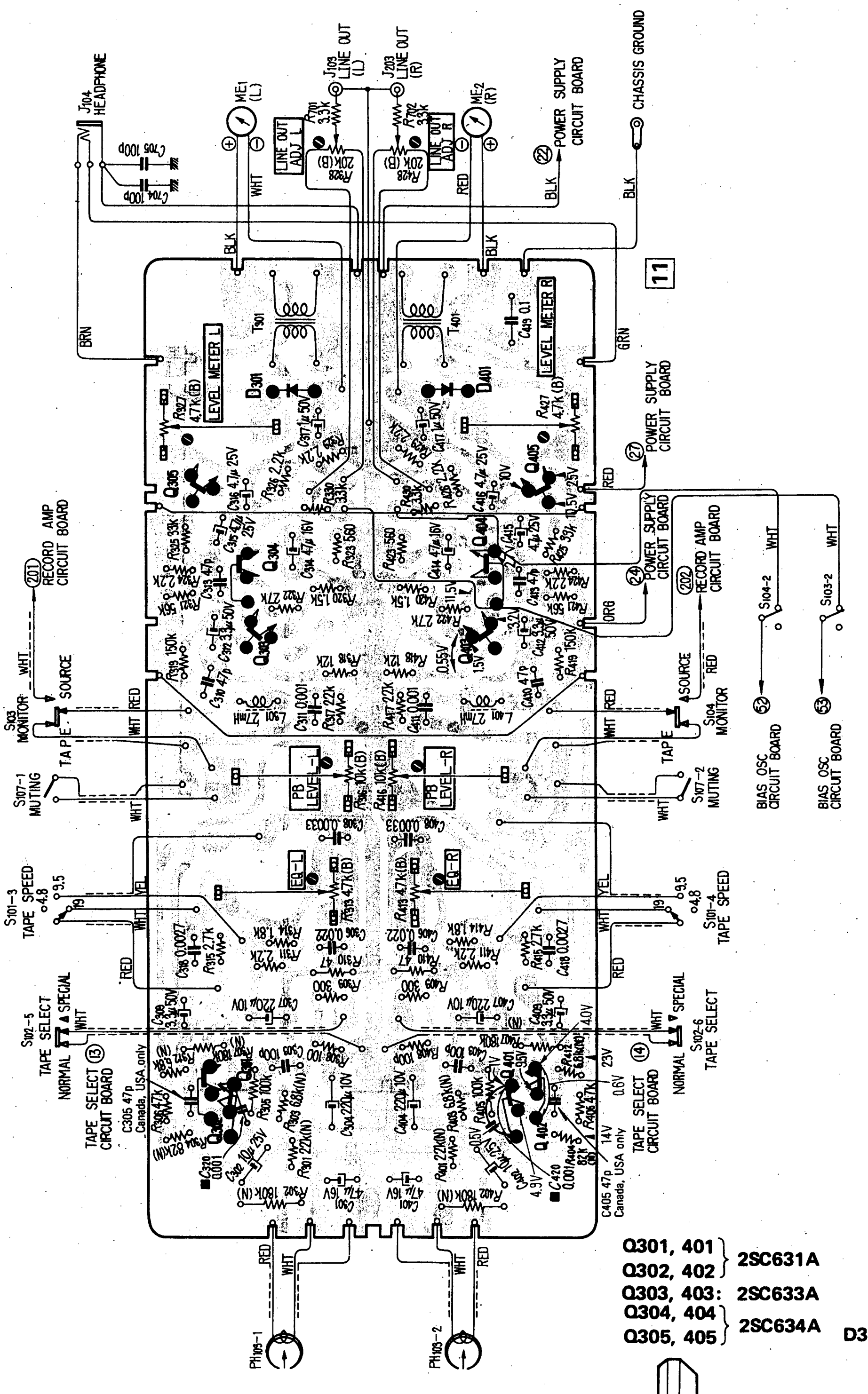

BIAS OSC CIRCUIT BOARD
MIC ATT
MICROPHONE (L)
MICROPHONE (R)
RECORD VOLUME MIC-L
RECORD VOLUME MIC-R
RECORD VOLUME LINE-L
RECORD VOLUME LINE-R
LINE IN (L)
LINE IN (R)
EARTH
REC LEVEL-L
REC LEVEL-R
TRAP COIL ADJ-L
TRAP COIL ADJ-R
TAPE SELECT SWITCH CIRCUIT BOARD
TAPE SPEED SW
POWER SUPPLY CIRCUIT BOARD
PLAYBACK AMP CIRCUIT BOARD
SPECIAL
NORMAL
CLEAR
WHT
RED
YEL
BRN
GRY
BLU
GRN
VLT
WHT/ORG
WHT/YEL
WHT/BRN
WHT/GRY
WHT/BLU
WHT/VLT
ORG
12

Q101, 201
Q102, 202 } **2SC631A**
Q103, 203
Q104, 204: 2SC634A



4-3-5. Playback Amp Circuit Board

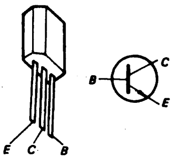
Conductor Side

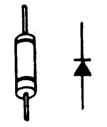

J104 HEADPHONE
C705 100p
C704 100p
ME1 (L)
J103 LINE OUT (L)
J203 LINE OUT (R)
ME2 (R)
LINE OUT ADJ L
LINE OUT ADJ R
R928 20K(B)
R428 20K(B)
R701 3.3K
R702 3.3K
㉒ POWER SUPPLY CIRCUIT BOARD
CHASSIS GROUND
BLK
WHT
RED
BRN
GRN
ORG
YEL
11
T501
T401
D301
D401
LEVEL METER L
LEVEL METER R
R327 4.7K(B)
R427 4.7K(B)
C413 0.1
Q305
Q405
Q304
Q404
Q303
Q403
㉗ POWER SUPPLY CIRCUIT BOARD
㉔ POWER SUPPLY CIRCUIT BOARD
⑳ RECORD AMP CIRCUIT BOARD
(201) RECORD AMP CIRCUIT BOARD
(202) RECORD AMP CIRCUIT BOARD
S103 MONITOR
S104 MONITOR
SOURCE
TAPE
S104-2
S103-2
㊷ BIAS OSC CIRCUIT BOARD
㊸ BIAS OSC CIRCUIT BOARD
S107-1 MUTING
S107-2 MUTING
PB LEVEL-L
PB LEVEL-R
R316 10K(B)
R416 10K(B)
EQ-L
EQ-R
R313 4.7K(B)
R413 4.7K(B)
S101-3 TAPE SPEED
S101-4 TAPE SPEED
9.5
4.8
19
S102-5 TAPE SELECT
S102-6 TAPE SELECT
NORMAL
SPECIAL
⑬ TAPE SELECT CIRCUIT BOARD
⑭ TAPE SELECT CIRCUIT BOARD
C305 47p Canada, USA only
C405 47p Canada, USA only
■C320 0.001
■C420 0.001
Q301
Q401
Q302
Q402
PH105-1
PH105-2

■: Mounted on the Conductor Side of Playback Amp Circuit Board.

Q301, 401
Q302, 402 } **2SC631A**
Q303, 403: 2SC633A
Q304, 404
Q305, 405 } **2SC634A**

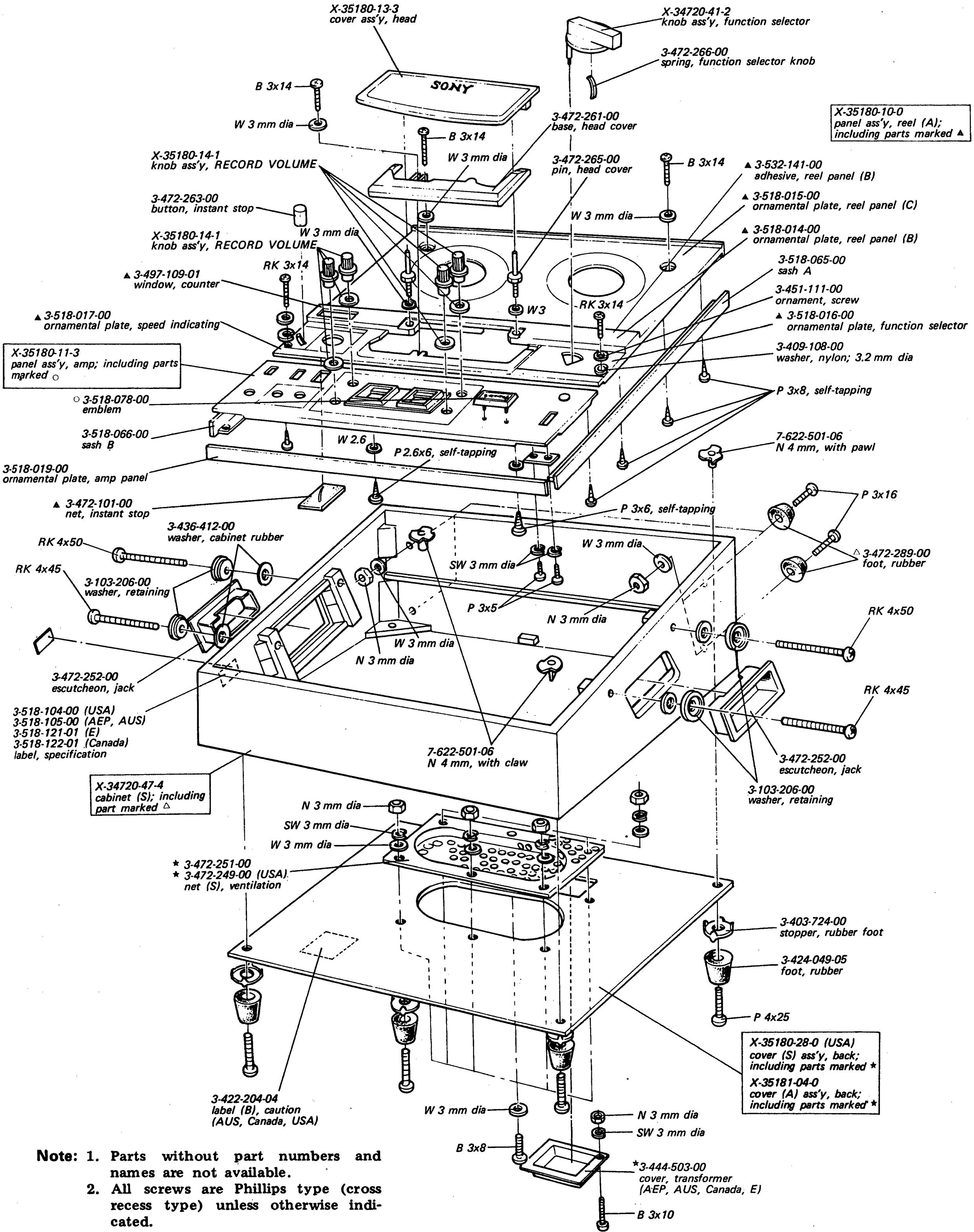
D301, 401: 1T22





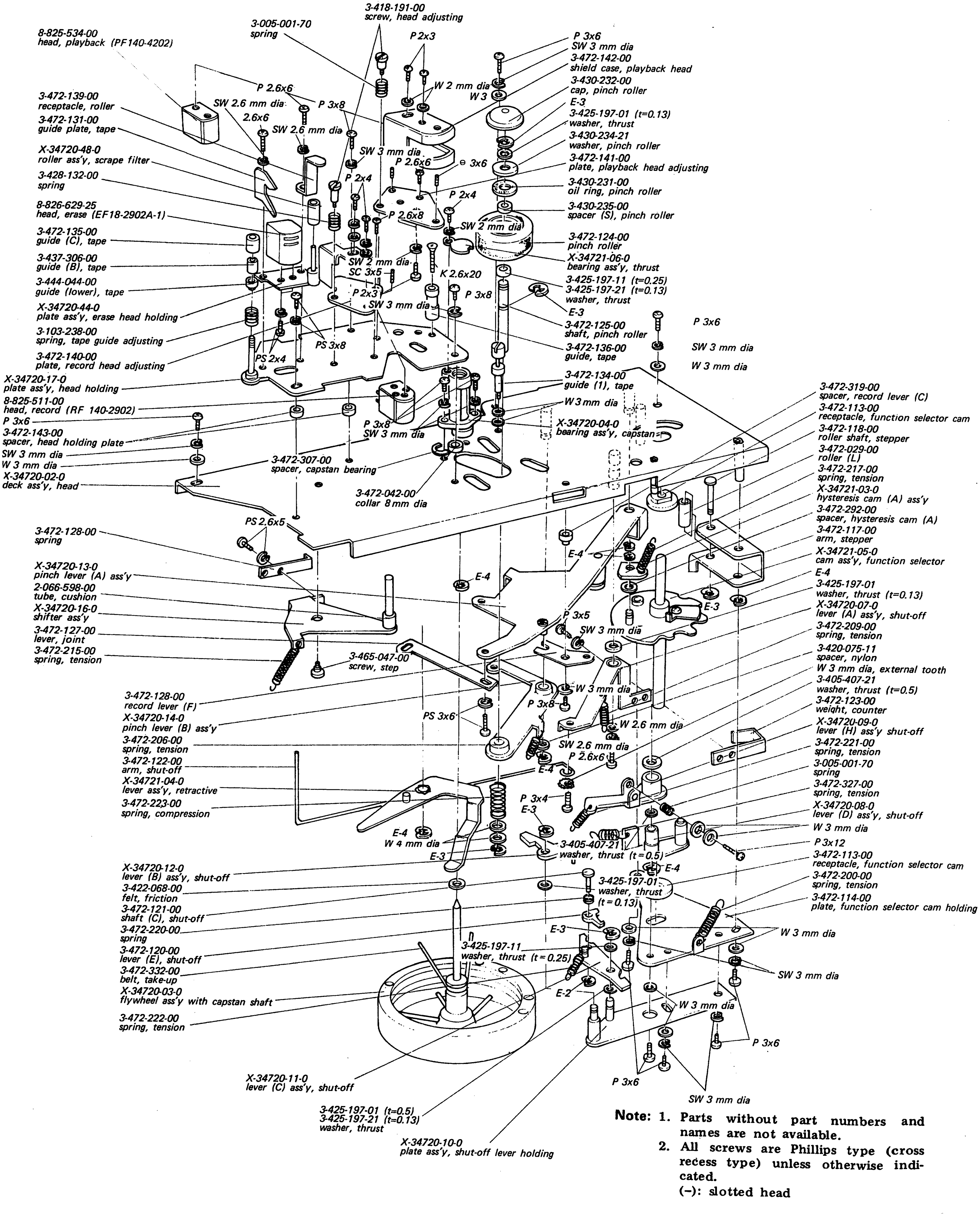
SECTION 5
EXPLODED VIEWS

5-1. CABINET – Top View –


X-35180-13-3
cover ass'y, head
X-34720-41-2
knob ass'y, function selector
3-472-266-00
spring, function selector knob
B 3x14
W 3 mm dia
B 3x14
3-472-261-00
base, head cover
X-35180-10-0
panel ass'y, reel (A);
including parts marked ▲
X-35180-14-1
knob ass'y, RECORD VOLUME
W 3 mm dia
3-472-265-00
pin, head cover
B 3x14
▲ 3-532-141-00
adhesive, reel panel (B)
3-472-263-00
button, instant stop
▲ 3-518-015-00
ornamental plate, reel panel (C)
W 3 mm dia
▲ 3-518-014-00
ornamental plate, reel panel (B)
X-35180-14-1
knob ass'y, RECORD VOLUME
W 3 mm dia
3-518-065-00
sash A
RK 3x14
▲ 3-497-109-01
window, counter
3-451-111-00
ornament, screw
W3
RK 3x14
▲ 3-518-016-00
ornamental plate, function selector
▲ 3-518-017-00
ornamental plate, speed indicating
3-409-108-00
washer, nylon; 3.2 mm dia
X-35180-11-3
panel ass'y, amp; including parts marked ○
P 3x8, self-tapping
○ 3-518-078-00
emblem
3-518-066-00
sash B
W 2.6
P 2.6x6, self-tapping
7-622-501-06
N 4 mm, with pawl
○ 3-518-019-00
ornamental plate, amp panel
P 3x16
▲ 3-472-101-00
net, instant stop
P 3x6, self-tapping
3-436-412-00
washer, cabinet rubber
RK 4x50
W 3 mm dia
△ 3-472-289-00
foot, rubber
RK 4x45
3-103-206-00
washer, retaining
SW 3 mm dia
P 3x5
N 3 mm dia
RK 4x50
W 3 mm dia
N 3 mm dia
3-472-252-00
escutcheon, jack
RK 4x45
3-518-104-00 (USA)
3-518-105-00 (AEP, AUS)
3-518-121-01 (E)
3-518-122-01 (Canada)
label, specification
7-622-501-06
N 4 mm, with claw
3-472-252-00
escutcheon, jack
X-34720-47-4
cabinet (S); including part marked △
3-103-206-00
washer, retaining
N 3 mm dia
SW 3 mm dia
W 3 mm dia
* 3-472-251-00
* 3-472-249-00 (USA)
net (S), ventilation
3-403-724-00
stopper, rubber foot
3-424-049-05
foot, rubber
P 4x25
X-35180-28-0 (USA)
cover (S) ass'y, back;
including parts marked *
X-35181-04-0
cover (A) ass'y, back;
including parts marked *
3-422-204-04
label (B), caution
(AUS, Canada, USA)
W 3 mm dia
N 3 mm dia
SW 3 mm dia
B 3x8
*3-444-503-00
cover, transformer
(AEP, AUS, Canada, E)
B 3x10

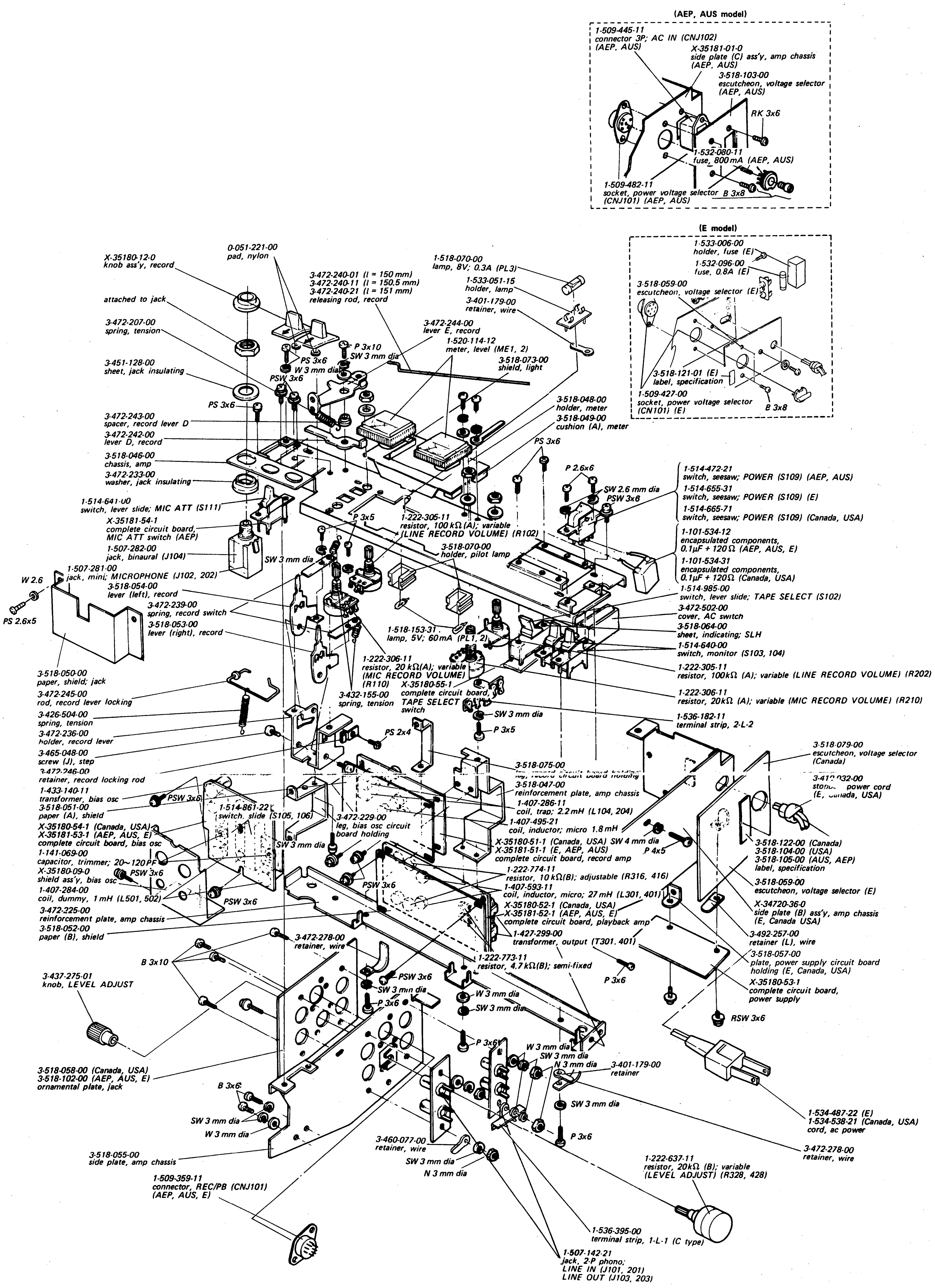
Note: 1. Parts without part numbers and names are not available.
2. All screws are Phillips type (cross recess type) unless otherwise indicated.
(–): slotted head

5-2. HEAD DECK – Top View –


8-825-534-00 head, playback (PF140-4202)
3-005-001-70 spring
3-418-191-00 screw, head adjusting
P 2x3
P 3x6
SW 3 mm dia
3-472-142-00 shield case, playback head
3-430-232-00 cap, pinch roller
E-3
3-425-197-01 (t=0.13) washer, thrust
3-430-234-21 washer, pinch roller
3-472-141-00 plate, playback head adjusting
3-430-231-00 oil ring, pinch roller
3-430-235-00 spacer (S), pinch roller
3-472-124-00 pinch roller
X-34721-06-0 bearing ass'y, thrust
3-425-197-11 (t=0.25)
3-425-197-21 (t=0.13) washer, thrust
E-3
3-472-125-00 shaft, pinch roller
3-472-136-00 guide, tape
3-472-134-00 guide (1), tape
W 3 mm dia
X-34720-04-0 bearing ass'y, capstan
P 3x6
SW 3 mm dia
W 3 mm dia
3-472-139-00 receptacle, roller
3-472-131-00 guide plate, tape
X-34720-48-0 roller ass'y, scrape filter
3-428-132-00 spring
8-826-629-25 head, erase (EF18-2902A-1)
3-472-135-00 guide (C), tape
3-437-306-00 guide (B), tape
3-444-044-00 guide (lower), tape
X-34720-44-0 plate ass'y, erase head holding
3-103-238-00 spring, tape guide adjusting
3-472-140-00 plate, record head adjusting
X-34720-17-0 plate ass'y, head holding
8-825-511-00 head, record (RF 140-2902)
P 3x6
3-472-143-00 spacer, head holding plate
SW 3 mm dia
W 3 mm dia
X-34720-02-0 deck ass'y, head
P 2.6x6
SW 2.6 mm dia
2.6x6
P 3x8
SW 2.6 mm dia
W 2 mm dia
W 3
SW 3 mm dia
P 2.6x6
⊖ 3x6
P 2x4
P 2x4
P 2.6x8
SW 2 mm dia
SW 2 mm dia
SC 3x5
K 2.6x20
P 2x3
SW 3 mm dia
P 3x8
PS 3x8
PS 2x4
P 3x8
SW 3 mm dia
3-472-307-00 spacer, capstan bearing
3-472-042-00 collar 8 mm dia
PS 2.6x5
3-472-319-00 spacer, record lever (C)
3-472-113-00 receptacle, function selector cam
3-472-118-00 roller shaft, stepper
3-472-029-00 roller (L)
3-472-217-00 spring, tension
X-34721-03-0 hysteresis cam (A) ass'y
3-472-292-00 spacer, hysteresis cam (A)
3-472-117-00 arm, stepper
X-34721-05-0 cam ass'y, function selector
E-4
3-425-197-01 washer, thrust (t=0.13)
X-34720-07-0 lever (A) ass'y, shut-off
3-472-209-00 spring, tension
3-420-075-11 spacer, nylon
W 3 mm dia, external tooth
3-405-407-21 washer, thrust (t=0.5)
3-472-123-00 weight, counter
X-34720-09-0 lever (H) ass'y shut-off
3-472-221-00 spring, tension
3-005-001-70 spring
3-472-327-00 spring, tension
X-34720-08-0 lever (D) ass'y, shut-off
W 3 mm dia
P 3x12
3-472-113-00 receptacle, function selector cam
3-472-200-00 spring, tension
3-472-114-00 plate, function selector cam holding
W 3 mm dia
SW 3 mm dia
3-472-128-00 spring
X-34720-13-0 pinch lever (A) ass'y
2-066-598-00 tube, cushion
X-34720-16-0 shifter ass'y
3-472-127-00 lever, joint
3-472-215-00 spring, tension
3-465-047-00 screw, step
E-4
E-4
E-3
P 3x5
SW 3 mm dia
W 3 mm dia
P 3x8
W 2.6 mm dia
SW 2.6 mm dia
P 2.6x6
PS 3x6
3-472-128-00 record lever (F)
X-34720-14-0 pinch lever (B) ass'y
3-472-206-00 spring, tension
3-472-122-00 arm, shut-off
X-34721-04-0 lever ass'y, retractive
3-472-223-00 spring, compression
E-4
P 3x4
E-3
E-4
W 4 mm dia
E-3
3-405-407-21 washer, thrust (t=0.5)
E-4
3-425-197-01 washer, thrust (t=0.13)
X-34720-12-0 lever (B) ass'y, shut-off
3-422-068-00 felt, friction
3-472-121-00 shaft (C), shut-off
3-472-220-00 spring
3-472-120-00 lever (E), shut-off
3-472-332-00 belt, take-up
X-34720-03-0 flywheel ass'y with capstan shaft
3-472-222-00 spring, tension
E-3
3-425-197-11 washer, thrust (t=0.25)
E-2
W 3 mm dia
P 3x6
P 3x6
SW 3 mm dia
X-34720-11-0 lever (C) ass'y, shut-off
3-425-197-01 (t=0.5)
3-425-197-21 (t=0.13) washer, thrust
X-34720-10-0 plate ass'y, shut-off lever holding

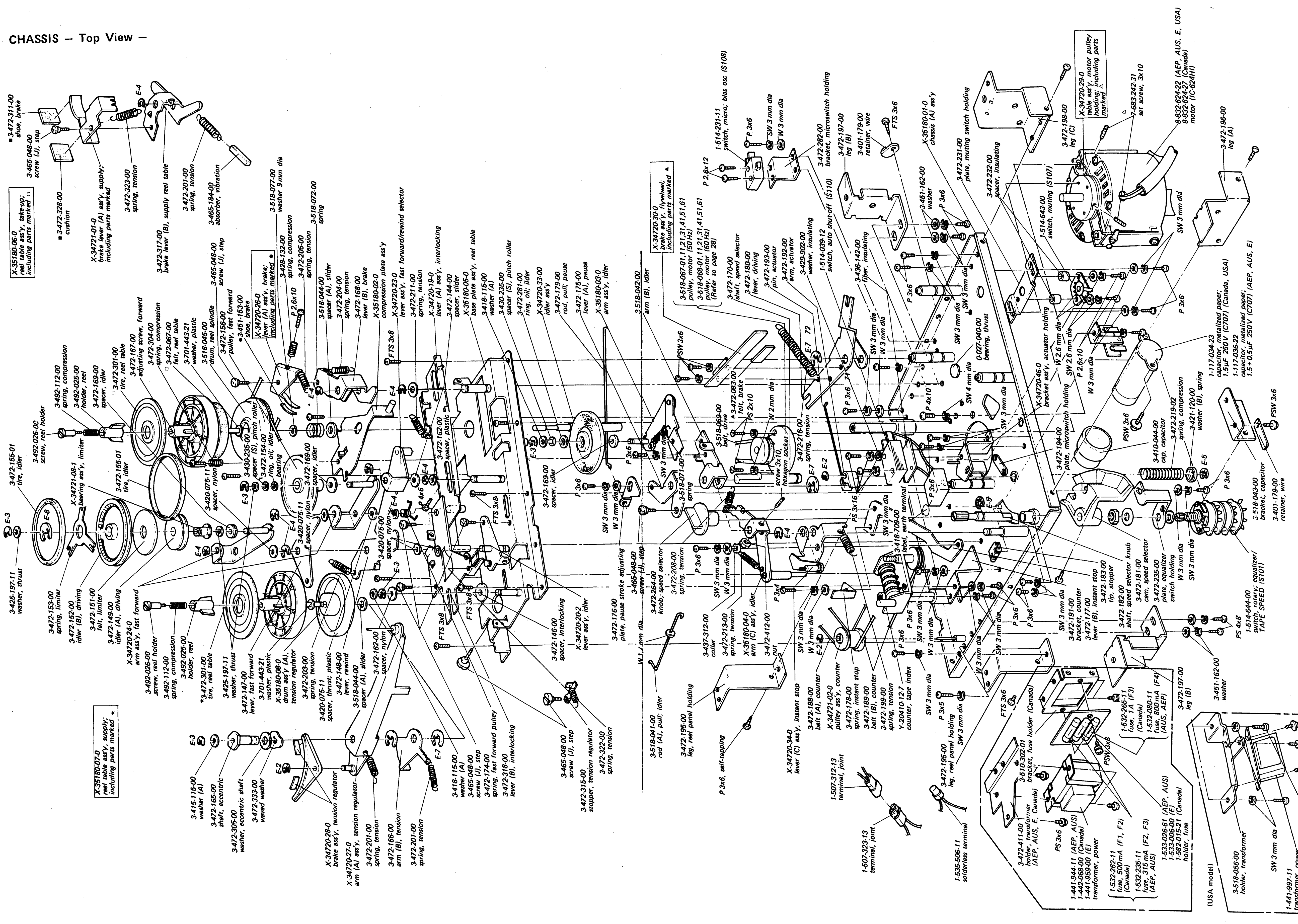
Note: 1. Parts without part numbers and names are not available.
2. All screws are Phillips type (cross recess type) unless otherwise indicated.
(–): slotted head

5-3. AMPLIFIER CHASSIS – Top View –


(AEP, AUS model)
1-509-445-11 connector 3P; AC IN (CNJ102) (AEP, AUS)
X-35181-01-0 side plate (C) ass'y, amp chassis (AEP, AUS)
3-518-103-00 escutcheon, voltage selector (AEP, AUS)
RK 3x6
1-532-080-11 fuse, 800 mA (AEP, AUS)
1-509-482-11 socket, power voltage selector (CNJ101) (AEP, AUS)
B 3x8
(E model)
1-533-006-00 holder, fuse (E)
1-532-096-00 fuse, 0.8A (E)
3-518-059-00 escutcheon, voltage selector (E)
3-518-121-01 (E) label, specification
1-509-427-00 socket, power voltage selector (CN101) (E)
B 3x8
X-35180-12-0 knob ass'y, record
0-051-221-00 pad, nylon
attached to jack
3-472-207-00 spring, tension
3-451-128-00 sheet, jack insulating
PS 3x6
3-472-243-00 spacer, record lever D
3-472-242-00 lever D, record
3-518-046-00 chassis, amp
3-472-233-00 washer, jack insulating
1-514-641-00 switch, lever slide; MIC ATT (S111)
X-35181-54-1 complete circuit board, MIC ATT switch (AEP)
1-507-282-00 jack, binaural (J104)
1-507-281-00 jack, mini; MICROPHONE (J102, 202)
W 2.6
PS 2.6x5
3-518-054-00 lever (left), record
3-472-239-00 spring, record switch
3-518-053-00 lever (right), record
3-518-050-00 paper, shield; jack
3-472-245-00 rod, record lever locking
3-426-504-00 spring, tension
3-472-236-00 holder, record lever
3-465-048-00 screw (J), step
3-472-246-00 retainer, record locking rod
1-433-140-11 transformer, bias osc
3-518-051-00 paper (A), shield
X-35180-54-1 (Canada, USA)
X-35181-53-1 (AEP, AUS, E)
complete circuit board, bias osc
1-141-069-00 capacitor, trimmer; 20~120PF
X-35180-09-0 shield ass'y, bias osc
1-407-284-00 coil, dummy, 1 mH (L501, 502)
3-472-225-00 reinforcement plate, amp chassis
3-518-052-00 paper (B), shield
B 3x10
3-437-275-01 knob, LEVEL ADJUST
3-518-058-00 (Canada, USA)
3-518-102-00 (AEP, AUS, E)
ornamental plate, jack
B 3x6
SW 3 mm dia
W 3 mm dia
3-518-055-00 side plate, amp chassis
1-509-359-11 connector, REC/PB (CNJ101) (AEP, AUS, E)
3-472-240-01 (l = 150 mm)
3-472-240-11 (l = 150.5 mm)
3-472-240-21 (l = 151 mm)
releasing rod, record
P 3x10
SW 3 mm dia
PS 3x6
W 3 mm dia
PSW 3x6
3-472-244-00 lever E, record
1-520-114-12 meter, level (ME1, 2)
3-518-073-00 shield, light
1-518-070-00 lamp, 8V; 0.3A (PL3)
1-533-051-15 holder, lamp
3-401-179-00 retainer, wire
3-518-048-00 holder, meter
3-518-049-00 cushion (A), meter
PS 3x6
P 2.6x6
SW 2.6 mm dia
PSW 3x6
P 3x5
1-222-305-11 resistor, 100 kΩ (A); variable (LINE RECORD VOLUME) (R102)
3-518-070-00 holder, pilot lamp
SW 3 mm dia
1-518-153-31 lamp, 5V; 60 mA (PL1, 2)
1-222-306-11 resistor, 20 kΩ(A); variable (MIC RECORD VOLUME) (R110)
3-432-155-00 spring, tension
X-35180-55-1 complete circuit board, TAPE SELECT switch
SW 3 mm dia
P 3x5
PS 2x4
1-514-472-21 switch, seesaw; POWER (S109) (AEP, AUS)
1-514-655-31 switch, seesaw; POWER (S109) (E)
1-514-665-71 switch, seesaw; POWER (S109) (Canada, USA)
1-101-534-12 encapsulated components, 0.1μF + 120Ω (AEP, AUS, E)
1-101-534-31 encapsulated components, 0.1μF + 120Ω (Canada, USA)
1-514-985-00 switch, lever slide; TAPE SELECT (S102)
3-472-502-00 cover, AC switch
3-518-064-00 sheet, indicating; SLH
1-514-640-00 switch, monitor (S103, 104)
1-222-305-11 resistor, 100kΩ (A); variable (LINE RECORD VOLUME) (R202)
1-222-306-11 resistor, 20kΩ (A); variable (MIC RECORD VOLUME) (R210)
1-536-182-11 terminal strip, 2-L-2
3-518-075-00 leg, record circuit board holding
3-518-047-00 reinforcement plate, amp chassis
1-407-286-11 coil, trap; 2.2 mH (L104, 204)
1-407-495-21 coil, inductor; micro 1.8 mH
PSW 3x6
1-514-861-22 switch, slide (S105, 106)
3-472-229-00 leg, bias osc circuit board holding
SW 3 mm dia
PSW 3x6
PSW 3x6
X-35180-51-1 (Canada, USA) SW 4 mm dia
X-35181-51-1 (E, AEP, AUS)
complete circuit board, record amp
P 4x5
1-222-774-11 resistor, 10 kΩ(B); adjustable (R316, 416)
1-407-593-11 coil, inductor, micro; 27 mH (L301, 401)
X-35180-52-1 (Canada, USA)
X-35181-52-1 (AEP, AUS, E)
complete circuit board, playback amp
1-427-299-00 transformer, output (T301, 401)
1-222-773-11 resistor, 4.7 kΩ(B); semi-fixed
P 3x6
3-472-278-00 retainer, wire
PSW 3x6
SW 3 mm dia
P 3x6
W 3 mm dia
SW 3 mm dia
P 3x6
W 3 mm dia
SW 3 mm dia
N 3 mm dia
3-401-179-00 retainer
SW 3 mm dia
P 3x6
3-460-077-00 retainer, wire
SW 3 mm dia
N 3 mm dia
3-518-079-00 escutcheon, voltage selector (Canada)
3-41[illegible]-032-00 stopper, power cord (E, Canada, USA)
3-518-122-00 (Canada)
3-518-104-00 (USA)
3-518-105-00 (AUS, AEP)
label, specification
3-518-059-00 escutcheon, voltage selector (E)
X-34720-36-0 side plate (B) ass'y, amp chassis (E, Canada USA)
3-492-257-00 retainer (L), wire
3-518-057-00 plate, power supply circuit board holding (E, Canada, USA)
X-35180-53-1 complete circuit board, power supply
RSW 3x6
1-534-487-22 (E)
1-534-538-21 (Canada, USA)
cord, ac power
3-472-278-00 retainer, wire
1-222-637-11 resistor, 20kΩ (B); variable (LEVEL ADJUST) (R328, 428)
1-536-395-00 terminal strip, 1-L-1 (C type)
1-507-142-21 jack, 2-P phono; LINE IN (J101, 201) LINE OUT (J103, 203)

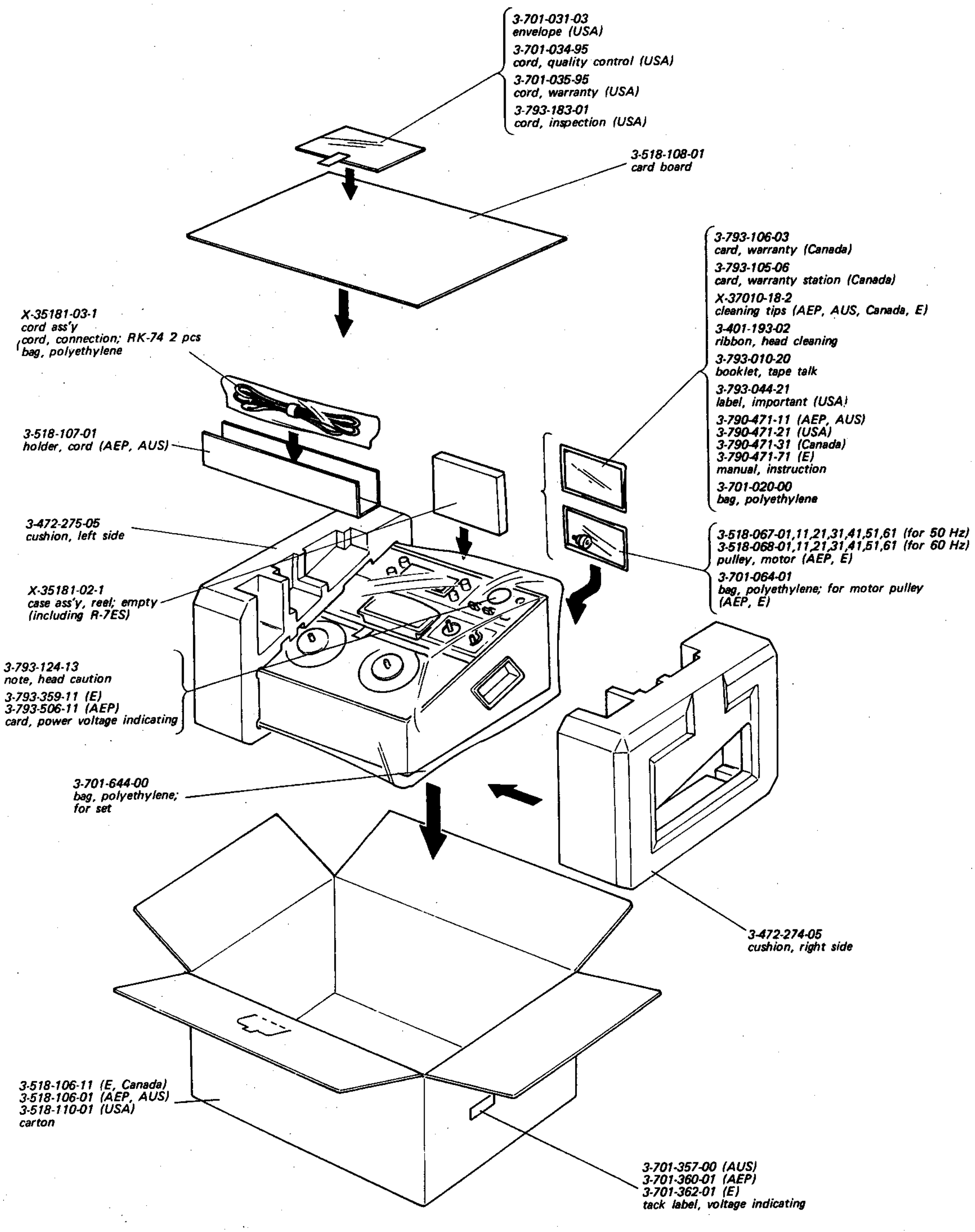
Note:
1. Parts without part numbers and names are not available.
2. All screws are Phillips type (cross recess type) unless otherwise indicated.
   (–): slotted head

5-4. CHASSIS – Top View –


X-35180-06-0 reel table ass'y, take-up; including parts marked □
X-35180-07-0 reel table ass'y, supply; including parts marked ✶
X-34720-26-0 lever (A) ass'y, brake; including parts marked ●
X-34720-30-0 brake ass'y, flywheel; including parts marked ▲
X-34720-29-0 table ass'y, motor pulley holding; including parts marked △
(USA model)

Note: 1. Parts without part numbers and names are not available.
2. All screws are Phillips type (cross recess type) unless otherwise indicated.
(–): slotted head

5-5. PACKING


3-701-031-03
envelope (USA)
3-701-034-95
cord, quality control (USA)
3-701-035-95
cord, warranty (USA)
3-793-183-01
cord, inspection (USA)
3-518-108-01
card board
3-793-106-03
card, warranty (Canada)
3-793-105-06
card, warranty station (Canada)
X-37010-18-2
cleaning tips (AEP, AUS, Canada, E)
3-401-193-02
ribbon, head cleaning
3-793-010-20
booklet, tape talk
3-793-044-21
label, important (USA)
3-790-471-11 (AEP, AUS)
3-790-471-21 (USA)
3-790-471-31 (Canada)
3-790-471-71 (E)
manual, instruction
3-701-020-00
bag, polyethylene
X-35181-03-1
cord ass'y
cord, connection; RK-74 2 pcs
bag, polyethylene
3-518-107-01
holder, cord (AEP, AUS)
3-472-275-05
cushion, left side
X-35181-02-1
case ass'y, reel; empty
(including R-7ES)
3-518-067-01,11,21,31,41,51,61 (for 50 Hz)
3-518-068-01,11,21,31,41,51,61 (for 60 Hz)
pulley, motor (AEP, E)
3-701-064-01
bag, polyethylene; for motor pulley
(AEP, E)
3-793-124-13
note, head caution
3-793-359-11 (E)
3-793-506-11 (AEP)
card, power voltage indicating
3-701-644-00
bag, polyethylene;
for set
3-472-274-05
cushion, right side
3-518-106-11 (E, Canada)
3-518-106-01 (AEP, AUS)
3-518-110-01 (USA)
carton
3-701-357-00 (AUS)
3-701-360-01 (AEP)
3-701-362-01 (E)
tack label, voltage indicating

Note: 1. **Parts without part numbers and names are not available..**
2. **All screws are Phillips type (cross recess type) unless otherwise indicated.**
(−): slotted head

SECTION 6
ELECTRICAL PARTS LIST

COMPLETE CIRCUIT BOARDS

Ref. No.	Part No.	Description
	X-35180-51-1	record amp (Canada, USA)
	X-35180-52-1	playback amp (Canada, USA)
	X-35180-53-1	power supply
	X-35180-54-1	bias osc (Canada, USA)
	X-35180-55-1	TAPE SELECT switch
	X-35181-51-1	record amp (AEP, AUS, E)
	X-35181-52-1	playback amp (AEP, AUS, E)
	X-35181-53-1	bias osc (AEP, AUS, E)

SEMICONDUCTORS

Ref. No.	Part No.	Description
Q101, 201		transistor 2SC631A
Q102, 202		transistor 2SC631A
Q103, 203		transistor 2SC631A
Q104, 204		transistor 2SC634A
Q301, 401		transistor 2SC631A
Q302, 402		transistor 2SC631A
Q303, 403		transistor 2SC633A
Q304, 404		transistor 2SC634A
Q305, 405		transistor 2SC634A
Q501		transistor 2SC634A
Q502		transistor 2SC634A
Q601		transistor 2SD291
Q602		transistor 2SC634A
Q603		transistor 2SC633A
D301, 401		diode 1T-22
D601		diode ZB1-19
D602		diode 10D-2
D603		diode 10D-2

COILS

Ref. No.	Part No.	Description
L101, 201	1-407-519-11	inductor, micro 8μH
L102, 202	1-407-493-21	inductor, micro 1.2 mH
L103, 203	1-407-495-21	inductor, micro 1.8 mH
L104, 204	1-407-286-11	coil, trap 2.2 mH
L301, 401	1-407-593-11	inductor, micro 27 mH
L501	1-407-284-00	coil, dummy 1 mH
L502	1-407-284-00	coil, dummy 1 mH
L503	1-407-198-21	inductor, micro 2.2 mH
L504	1-407-198-21	inductor, micro 2.2 mH

TRANSFORMERS

Ref. No.	Part No.	Description
T301, 401	1-427-299-00	output
T501	1-433-140-11	bias osc
T701	1-441-997-11	power (USA)
	1-441-944-11	power (AEP, AUS)
	1-441-959-00	power (E)
	1-442-068-00	power (Canada)

CAPACITORS

All capacitors are microfarads unless otherwise noted. (p = $\mu\mu$F, elect = electrolytic)

Ref. No.	Part No.	Description		
C101, 201	1-121-410-11	47	25V	elect
C102, 202	1-127-094-11	1	25V	solid aluminum elect
C103, 203	1-105-821-12	0.001	50V	mylar
C104, 204	1-121-413-11	100	6.3V	elect
C105, 205	1-127-095-11	2.2	25V	solid aluminum elect
C106, 206	1-127-094-11	1	25V	solid aluminum elect
C107, 207	1-121-404-11	33	25V	elect
C108, 208	1-105-821-12	0.001	50V	mylar
C109, 209	1-121-409-11	47	16V	elect
C110, 210	1-121-398-11	10	25V	elect
C111, 211	1-121-398-11	10	25V	elect
C112, 212	1-105-663-12	0.0015	50V	mylar
C113, 213	1-121-420-11	220	10V	elect
C114, 214	1-121-395-11	4.7	25V	elect
C115, 215	1-121-404-11	33	25V	elect
C116, 216	1-121-398-11	10	25V	elect
C117, 217	1-121-395-11	4.7	25V	elect
C118, 218	1-105-520-12	0.039	50V	mylar
C119, 219	1-105-517-12	0.022	50V	mylar
C120, 220	1-105-522-12	0.056	50V	mylar
C121, 221	1-105-519-12	0.033	50V	mylar
C122, 222	1-105-523-12	0.068	50V	mylar
C123, 223	1-121-398-11	10	25V	elect
C124, 224	1-107-016-11	470	50V	silvered mica
C301, 401	1-121-409-11	47	16V	elect
C302, 402	1-121-398-11	10	25V	elect
C303, 403	1-107-131-11	100p	50V	silvered mica

Ref. No.	*Part No.*	*Description*		
C304, 404	1-121-420-11	220	10 V	elect
C305, 405	1-107-123-11	47 p	50 V	silvered mica (Canada, USA)
C306, 406	1-105-517-12	0.022	50 V	mylar
C307, 407	1-121-420-11	220	10 V	elect
C308, 408	1-106-667-12	0.0033	50 V	mylar
C309, 409	1-121-393-11	3.3	50 V	elect
C310, 410	1-107-123-11	47 p	50 V	silvered mica
C311, 411	1-105-661-12	0.001	50 V	mylar
C312, 412	1-121-393-11	3.3	50 V	elect
C313, 413	1-107-123-11	47 p	50 V	silvered mica
C314, 414	1-121-409-11	47	16 V	elect
C315, 415	1-121-395-11	4.7	25 V	elect
C316, 416	1-121-395-11	4.7	25 V	elect
C317, 417	1-121-391-11	1	50 V	elect
C318, 418	1-105-666-12	0.0027	50 V	mylar
C419	1-105-845-12	0.1	50 V	mylar
C320, 420	1-105-661-12	0.001	50 V	mylar
C501	1-107-008-11	150p	500 V	silvered mica
C502	1-107-008-11	150p	500 V	silvered mica
C503	1-141-069-11	20 ~ 120p		trimmer
C504	1-141-069-11	20 ~ 120p		trimmer
C505	1-107-221-11	560p	1,500 V	silvered mica
C506	1-105-719-12	0.033	100 V	mylar
C507	1-127-094-11	1	25 V	solid aluminum elect
C508	1-105-712-12	0.0082	100 V	mylar
C509	1-106-060-12	0.0012	100 V	mylar (AEP, AUS, E)
C510	1-106-060-12	0.0012	100 V	mylar (AEP, AUS, E)
C601	1-121-388-11	1,000	35 V	elect
C602	1-121-405-11	33	50 V	elect
C603	1-121-810-11	470	50 V	elect
C604	1-121-396-11	4.7	50 V	elect
C701	1-107-175-11	180p	50 V	silvered mica
C702	1-107-175-11	180p	50 V	silvered mica
C703	1-107-131-11	100p	50 V	silvered mica
C704	1-107-131-11	100p	50 V	silvered mica
C705	1-107-131-11	100p	50 V	silvered mica
C706	1-105-759-12	0.033	200 V	mylar
C707	1-117-034-23	1.5	250 V	metalized paper (Canada, USA)
	1-117-036-22	1.5+0.5	250 V	metalized paper (AEP, AUS, E)
C708	1-107-131-11	100p		silvered mica

RESISTORS

All resistors are ¼W, carbon type and in Ω unless otherwise noted.

Ref. No.	*Part No.*	*Description*	
R101, 201	1-244-719-11	82 k	
R102, 202	1-222-305-11	100 k (A)	variable (LINE RECORD VOLUME)
R103, 203	1-242-663-11	390	
R104, 204	1-242-687-09	3.9 k	low noise
R105, 205	1-242-709-09	33 k	low noise
R106, 206	1-242-729-09	220 k	low noise
R107, 207	1-242-681-11	2.2 k	
R108, 208	1-242-659-11	270	
R109, 209	1-242-697-09	10 k	low noise
R110, 210	1-222-306-11	20 k (A)	variable (MIC RECORD VOLUME)
R111, 211	1-244-679-11	1.8 k	
R112, 212	1-242-731-09	270 k	low noise
R113, 213	1-242-729-09	220 k	low noise
R114, 214	1-242-699-09	12 k	low noise
R115, 215	1-242-663-11	390	
R116, 216	1-242-691-09	5.6 k	low noise
R117, 217	1-242-693-11	6.8 k	
R118, 218	1-242-717-09	68 k	low noise
R119, 219	1-242-711-09	39 k	low noise
R120, 220	1-242-725-09	150 k	low noise
R121, 221	1-242-717-09	68 k	low noise
R122, 222	1-242-749-11	1.5 M	
R123, 223	1-242-673-11	1 k	
R124, 224	1-242-641-11	47	
R125, 225	1-242-687-09	3.9 k	low noise
R126, 226	1-242-687-11	3.9 k	
R127, 227	1-242-697-11	10 k	
R128, 228	1-222-774-11	10 k (B)	adjustable (record level adj)
R129, 229	1-242-665-11	470	
R130, 230	1-242-707-11	27 k	
R131, 231	1-242-721-11	100 k	
R132, 232	1-242-721-11	100 k	
R133, 233	1-242-673-11	1 k	
R134, 234	1-242-681-11	2.2 k	
R135, 235	1-242-689-11	4.7 k	
R136, 236	1-242-689-11	4.7 k	
R137, 237	1-242-635-11	27	
R138, 238	1-242-689-11	4.7 k	
R139, 239	1-242-645-11	68	
R301, 401	1-242-705-09	22 k	low noise
R302, 402	1-242-727-09	180 k	low noise
R303, 403	1-242-693-09	68 k	low noise
R304, 404	1-242-719-09	82 k	low noise
R305, 405	1-242-721-11	100 k	
R306, 406	1-242-713-11	47 k	
R307, 407	1-242-727-09	180 k	low noise
R308, 408	1-242-649-11	100	
R309, 409	1-242-660-11	300	
R310, 410	1-242-641-11	47	
R311, 411	1-242-681-11	2.2 k	
R312, 412	1-242-693-09	6.8k	low noise

Ref. No.	*Part No.*	*Description*
R313, 413	1-222-773-11	4.7 k (B) adjustable (PB EQ adj)
R314, 414	1-242-679-11	1.8 k
R315, 415	1-242-683-11	2.7 k
R316, 416	1-222-774-11	10 k (B) adjustable (PB EQ adj)
R317, 417	1-242-705-11	22 k
R318, 418	1-242-699-11	12 k
R319, 419	1-242-725-11	150 k
R320, 420	1-242-677-11	1.5 k
R321, 421	1-242-715-11	56 k
R322, 422	1-242-707-11	27 k
R323, 423	1-242-667-11	560
R324, 424	1-242-681-11	2.2 k
R325, 425	1-242-709-11	33 k
R326, 426	1-242-681-11	2.2 k
R327, 427	1-222-773-11	4.7 k (B) adjustable (level meter adj)
R328, 428	1-222-637-11	20 k (B) variable (LEVEL ADJUST)
R329, 429	1-242-681-11	2.2 k
R340, 440	1-242-685-11	3.3k (AEP, AUS, E)
R501	1-242-617-11	4.7
R502	1-244-711-11	39 k
R503	1-244-625-11	10
R504	1-244-625-11	10
R505	1-242-643-11	56
R506	1-242-643-11	56
R601	1-202-549-31	100 (½) composition
R602	1-202-541-31	47 (½) composition
R603	1-242-711-11	39 k
R604	1-242-701-11	15 k
R605	1-242-675-11	1.2 k
R606	1-242-717-11	68 k
R701	1-244-685-11	3.3 k
R702	1-244-685-11	3.3 k

SWITCHES

Ref. No.	*Part No.*	*Description*
S101	1-514-644-00	rotary, equalizer; TAPE SPEED
S102	1-514-985-00	lever slide, TAPE SELECT
S103	1-514-640-00	lever slide, MONITOR(L-CHANNEL)
S104	1-514-640-00	lever slide, MONITOR(R-CHANNEL)
S105	1-514-861-22	slide, record/playback (L-CH)
S106	1-514-861-22	slide, record/playback (R-CH)
S107	1-514-643-00	rotary, muting
S108	1-514-231-11	micro, bias osc
S109	1-514-655-31	seesaw, POWER (E)
	1-514-472-21	seesaw, POWER (AEP, AUS)
	1-514-655-71	seesaw, POWER (Canada, USA)
S110	1-514-039-12	micro, auto shut-off
S111	1-514-641-00	lever slide, MIC ATT

JACKS

Ref. No.	*Part No.*	*Description*
J101, 201	1-507-142-21	2-P phono, LINE IN
J102, 202	1-507-281-00	mini, MICROPHONE
J103, 203	1-507-142-21	2-P phono, LINE OUT
J104	1-507-282-00	binaural, HEADPHONE
CNJ101	1-509-359-11	connector, REC/PB (AEP, AUS, E)
CNJ102	1-509-445-11	connector 3-P, AC IN (AEP, AUS)
CN101	1-509-427-11	socket, power voltage selector (E)
	1-509-482-11	socket, power voltage selector (AEP, AUS)

MISCELLANEOUS

Ref. No.	*Part No.*	*Description*
M	8-832-624-22	motor, IC-624H1 (AEP, AUS, E, USA)
	8-832-624-27	motor, IC-624H1 (Canada)
CP701, CP702	1-101-534-12	encapsulated components, 0.1μF + 120Ω (AEP, AUS, E)
	1-101-534-31	encapsulated components, 0.1μF + 120Ω (Canada, USA)
RH101	8-825-511-00	head, record (RF140-2902)
PH103	8-825-534-00	head, playback (PF140-4202)
EH102	8-826-629-25	head, erase (EF18-2902A1)
PL1, 2	1-518-153-31	lamp, 5 V/60 mA
PL3	1-518-070-00	lamp, 8 V/0.3 A
	1-533-051-15	holder, lamp
ME1, 2	1-520-114-12	meter, level
F1	1-532-096-00	fuse, 800mA (E)
	1-532-080-11	fuse, 800mA (AEP, AUS)
F1, 2	1-532-262-11	fuse, 500mA (Canada)
F2	1-532-235-11	fuse, 315mA (AEP, AUS)
F3	1-532-235-11	fuse, 315mA (AEP, AUS)
	1-532-265-11	fuse, 1A (Canada)
F4	1-532-080-11	fuse, 800mA (AEP, AUS)
	1-533-006-00	holder, fuse (E)
	1-533-026-61	holder, fuse (AEP, AUS)
	1-582-015-21	holder, fuse (Canada)
	1-534-487-22	cord, ac power (E)
	1-534-538-21	cord, ac power (Canada, USA)
	1-535-506-11	solderless terminal
	1-536-395-11	terminal strip, 1-L-1 (C type)
	1-536-398-11	terminal strip, 2-L-2 (C type)
	1-506-312-13	terminal, joint
	1-507-323-13	terminal, joint

SECTION 7
HARDWARE

SCREWS

Part No.	*Description*
7-621-259-42	P 2.6 x 6
7-621-259-52	P 2.6 x 8
7-621-259-62	P 2.6 x 10
7-621-259-72	P 2.6 x 12
7-621-560-52	K 2.6 x 22
7-621-711-35	B 2.6 x 6
7-621-771-38	B 2.6 x 8
7-628-145-01	P 3 x 4
7-628-147-01	P 3 x 6
7-628-148-01	P 3 x 8
7-628-149-01	P 3 x 10
7-628-150-01	P 3 x 12
7-628-160-01	P 3 x 6
7-628-161-01	P 4 x 8
7-628-547-13	B 3 x 6
7-628-548-13	B 3 x 8
7-682-549-13	B 3 x 10
7-682-550-14	B 3 x 12
7-682-551-15	B 3 x 4
7-682-562-13	B 4 x 10
7-682-571-14	B 4 x 45
7-682-624-00	PS 2 x 4
7-682-627-00	PS 2 x 8
7-682-633-00	PS 2.6 x 4
7-682-635-00	PS 2.6 x 6
7-682-637-00	PS 2.6 x 10
7-682-646-00	PS 3 x 5
7-682-647-00	PS 3 x 6
7-682-648-00	PS 3 x 8
7-682-652-00	PS 3 x 16
7-682-660-00	PS 4 x 6
7-682-661-00	PS 4 x 8
7-683-140-01	⊖ SC 3 x 6, flat point
7-683-242-31	SC 3 x 10
7-685-145-21	P 3 x 6, self-tapping
7-685-146-21	P 3 x 8, self-tapping
7-685-549-01	P 3 x 16

WASHERS

Part No.	*Description*	
7-623-105-12	2 mm dia	
7-623-107-02	2.6 mm dia	(small)
7-623-107-22	2.6 mm dia	
7-623-108-02	3 mm dia	(small)
7-623-108-12	3 mm dia	(nickel plated)
7-623-108-18	3 mm dia	(chrome plated)
7-623-108-20	3 mm dia	
7-623-110-02	4 mm dia	(small)
7-623-110-12	4 mm dia	
7-623-113-12	6 mm dia	
7-623-208-22	3 mm dia, spring	
7-623-408-05	3 mm dia, external tooth	

NUTS

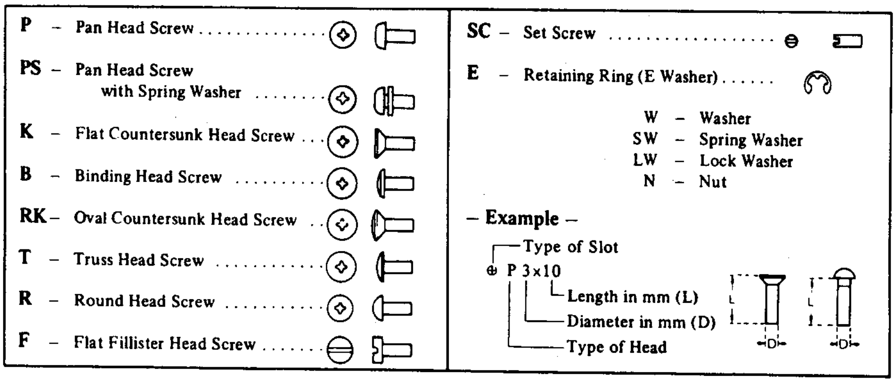
Part No.	*Description*
7-622-108-02	3 mm dia
7-622-501-06	4 mm dia

RETAINING RINGS

Part No.	*Description*
7-624-104-01	E-2
7-624-106-01	E-3
7-624-108-01	E-4
7-624-109-01	E-5
7-624-110-01	E-6
7-624-111-01	E-7
7-624-112-01	E-8

Note: All screws are Phillips type (cross recess type) unless otherwise indicated.
(-): slotted head

– Hardware Nomenclature –



P – Pan Head Screw
PS – Pan Head Screw with Spring Washer
K – Flat Countersunk Head Screw
B – Binding Head Screw
RK – Oval Countersunk Head Screw
T – Truss Head Screw
R – Round Head Screw
F – Flat Fillister Head Screw

SC – Set Screw
E – Retaining Ring (E Washer)

W – Washer
SW – Spring Washer
LW – Lock Washer
N – Nut

– Example –